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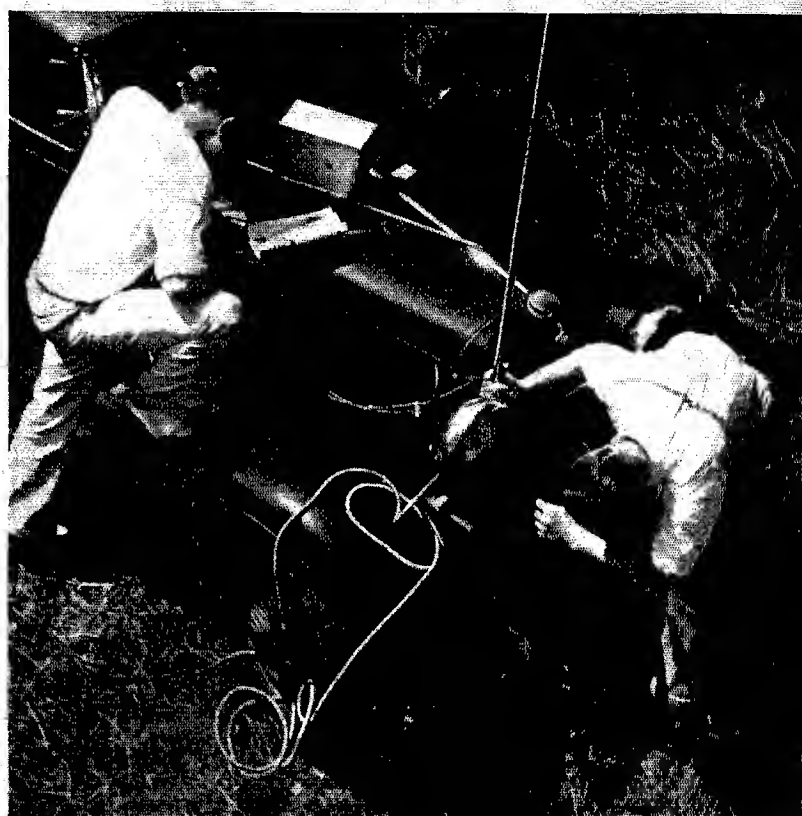
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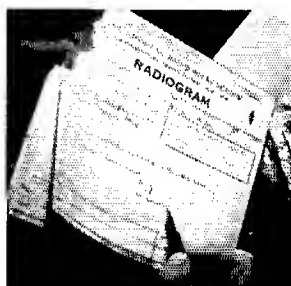


STATION SERVICE



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 1000...
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RADIOGRAMS...
 THE AMERICAN RADIO...
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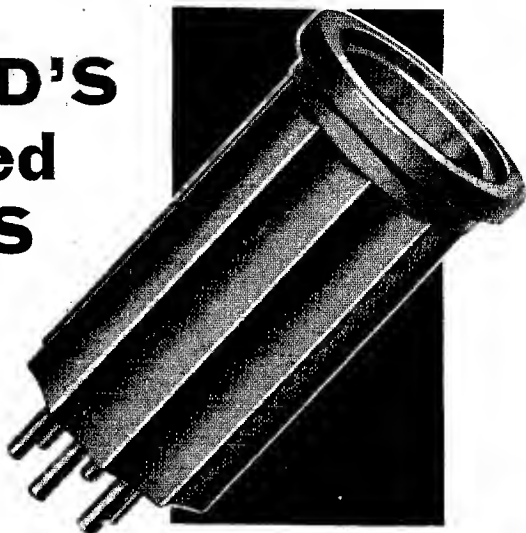


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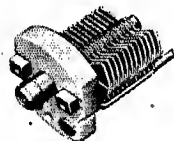
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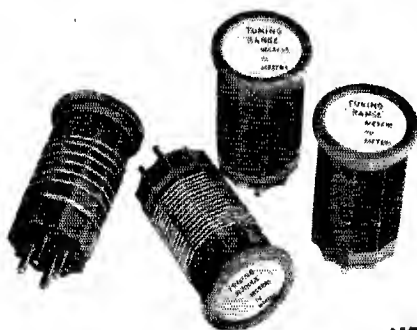
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QST

Published monthly, as its official organ, by the American Radio Relay League, Inc., at West Hartford, Conn., U. S. A.; Official Organ of the International Amateur Radio Union

devoted entirely to

AMATEUR RADIO



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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is non-commercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the world and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite. Correspondence should be addressed to the Secretary.

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THE EDITOR'S MILL

AS FAR back as any of us can remember in amateur radio, our biggest practical problem has been the interference caused by congestion. Perhaps more than any other factor it has been responsible for keeping us alert technically and cooperative in our operating practices. It still exists as our big problem and it seems that it must always get a good share of our thought and attention.

There are three possible solutions to the amateur interference problem. Most obvious, and undoubtedly most popular with the average amateur, would be more territory. Indeed, this probably constitutes the only 100% solution, for provided we got an infinite amount of space we could operate without interference regardless of punk technical practices and worse operating. Unfortunately, from the practical aspect this particular solution is one of the most difficult to achieve, as most of us know only too well. The League is hammering away at the problem, but in any event we will have to make out with our present territory for the next five years, so in considering ways and means for more immediate relief we must seek elsewhere.

The next most obvious solution is technical improvements, to enable us to work more stations in a given space. Amateur technical progress the past five years has been amazing. One of the League's jobs is to keep our technical ability ahead of the existing situation, and that the *QST* technical staff has shown us how to do. Highly selective receivers and stable transmitters with good notes are the order of the day. The single-signal superheterodyne, the tri-tet exciter unit, new tubes, superior 'phone circuits, better power supplies and radiating systems and modern monitoring: there is no comparison with our technical status of five years ago.

But still we have interference, which leads us to an examination of our third remedy: the use of a little more intelligence and cooperation in our operating practices.

More than either of the others, this last method of attack is up to you fellows, as individual amateurs. Were we compelled to spread ourselves throughout all our amateur holdings, each of us staying in a small assigned bailiwick, probably there would be comfortable room for every existing amateur station in our present territory. Of course we can't do that, and this is a free country in which every fellow has the right to try everything that is reasonable. But it seems to us that there is room for the application of a great deal more intelligence than we use to-day, when with no necessity for it we all try to get on about the same frequency and do the same things at the same time. One of the most foolish things we do is to use any old band for any old distance, if it will work. Of course it's fun (and that's why we are radio amateurs) but it isn't a very sensible thing to do when it badly increases the interference in our bands. Too many of us work on only one or two bands and don't change often enough. As a matter of principle we ought to be able to use more bands and, within rather broad limits, for each distance that we work we ought to select the band that will lay down the best signal with the least power. By all that is sensible, there ought to be in every amateur station a device for reducing the power, after contact is established, to that which just gives comfortable communication—and instead, like senseless galoots, we're all striving to be QSA5 R9 at every point on the globe simultaneously! Again allowing every opportunity for free choice, amateur radio offers so many facets that the diversification of individual activities, with resultant diversification of operating hours, ought to be practiced for its own merits as well as being a positive relief to the interference situation. There are many other things that might be mentioned, things that *QST* has preached for many years but which still apply: Clean the whiskers off of your signals; the rest of us now demand it. Although friendly intercourse is the very breath of ham radio, remember to be considerate of others. Cut out the long calls; if the fellow tunes to you, he'll hear a short call; if he doesn't tune to you, he'll never hear you in a million years. Use break-in; it's about the best-known interference minimizer but its chief merit is that it's swell sport. One of the dumbest things we hams do is pile on top of each other, six deep, at the low-frequency end of our harmonic family, simply for the sake of being able to double into the successively narrower high-frequency bands — leaving large green pastures of relatively open space in the middle portion of the band. One simple escape from the fantastic snarl of QRM which decorates our low-frequency edges is to blow yourself to an additional crystal for one of those frequencies in the less-congested central part of the band that does not double into a higher band. It is still a good com-

municating frequency and if it is more difficult to raise a QSO from such a frequency it only proves that we haven't yet organized our operations as intelligently as we might.

Amateur radio is often spoken of as a many-mooded mistress, all things to all men. We should know her better than we do. In the infinite variety of her charms there is increasing joy. And from the practical ham standpoint, by diversification of activity and the application of a little common sense, there is relief from much needless interference.

K. B. W.

Strays

From W2DTE comes a clipping from one of the New York papers in which the radio "expert" advises an anxious reader that blue glow in an 83 is a sign of gas and indicates a defective tube that should be replaced!

To prevent ruining a 59 should the crystal in a Tri-tet oscillator refuse to "go," Clyde B. Trevey of Beaumont, Texas, suggests connecting a flash-light cell in series with the grid lead to provide a little fixed bias. Without this protection the screen is likely to get hot and cause abnormal plate current to flow, especially if the screen voltage is much over the recommended 100 volts.

Keeping up with the "midget" spirit of the times, W9LWB has a miniature QSL card. Measuring a little less than 2 by 3½ inches, it's just about the size of the ordinary calling card.

It seems that silvering is not the only way to lower the frequency of a crystal. W6QF, wanting to shift to a slightly lower frequency in the 75-meter 'phone band, rubbed his 160-meter crystal gently with aluminum powder, cleaned off the edges, and found that the second harmonic had shifted six kilocycles, which was plenty to clear a heterodyne.

Magnetic Materials at Radio Frequencies

Recent revival of interest in the use of radio-frequency transformers having magnetic rather than the more usual non-magnetic (air) cores has directed particular attention to late developments in high-permeability materials for use in r.f. transformers. An impartial survey of the present knowledge of magnetic materials and compositions has been made by a sub-committee of the Radio Research Board of the Department of Scientific and Industrial Research, of Great Britain. The results of this survey are given in thorough and comprehensive fashion in Radio Research Special Report No. 14, "Magnetic Materials at Radio Frequencies," by F. M. Colebrook. Copies of this report are obtainable from the British Library of Information, 270 Madison Ave., New York, at 17 cents each.

W9LQE spent a few sleepless nights wondering why a supposedly good r.f. choke wouldn't do its stuff in his final amplifier, only to discover later that the choke was OK when the milliammeter behind it was shorted out. Things returned to normal when one of the choke pies was short-circuited to compensate for the added inductance of the meter. A by-pass from the "cold" end of the choke to ground or across the meter terminals should also cure troubles of this sort.

An automobile headlight bulb makes a cheap substitute for an antenna ammeter, having such low inductance that the tuning of the antenna circuit is not disturbed. The 15-candle-power size is about right for a 10 with 50 watts input. An old stunt—but it may be overlooked now and then.

—W1BTG

LI'L' BRASS KEY

(You know the tune)

My rig and I live all alone
Right upstairs, where we hold our own.
I pound brass from morn till night,
And the way I work is sure a fright.
Hiyi, Hiyi, you and me,
Li'l' brass key, don't I love thee!

The signals roam to who knows where,
Maybe here and maybe there.
If an Aussie hears it, goodness me,
I'll be as happy as can be.
Hiyi, Hiyi, you and me,
Li'l' brass key, don't I love thee!

I call ZL's and Aussies too,
But no matter what or who,
I can ne'er an answer get,
ALL I do is sit and fret.
Hiyi, Hiyi, you and me,
Li'l' brass key, don't I love thee!

Once a guy was calling me,
I was as happy as could be,
But when the poor soul gave his call
As W9-, 'twas nothin' a'tall.
Hiyi, Hiyi, you and me,
Li'l' brass key, don't I love thee!

I called an "X" the other day,
He came back as if to say,
What a note, boy, what a note!!
Sounds like a frog wid a clogged up throat!
Hi hi Hiyi, you and me,
Li'l' brass key, don't I love thee!

I've also called some PY2's,
But of course I went and blew a fuse,
I threw the pliers at Ye Olde Two Ten,
Called it a day and left the den.
Hiyi, Hiyi, you and me,
Dern old rig, you frustrate me!

—W9EG

Increased Radiating Efficiency for Short Antennas

A Tuned-Top System for Amateur Frequencies

By R. B. Dome*

Antennas necessarily foreshortened because of the space limitations that afflict many amateur installations are a real handicap to station performance. Although the problem has received occasional attention, no particular design of predictable performance that could be applied generally has heretofore been available to hamdom. The novel system of tuned loading developed by a fellow amateur, W2ETH, and described by Mr. Dome in this article, therefore is welcomed as a promising solution of one of our most vexing problems. The development should be of interest to every amateur.—EDITOR

OPERATING at 80 and 160 meters where space is limited, usually results in the necessity of increasing the transmitter power to make up for the low efficiency of the antenna installed in the restricted area. Such practice is wasteful of power and equipment besides being much more expensive initially. It is the purpose of this paper to describe a new method of tuning relatively short antennas to render them as effective radiators as possible for their height.

The inefficiency of short radiators results from two causes: First, the relatively high ground connection losses caused by the passage of relatively large current into the earth whose resistance is usually high in amateur installations where good grounds are hard to obtain; and second, the vertical field pattern is such that the ground-wave to sky-wave ratio is relatively low, resulting in the transmission of power in directions not generally useful.

The first cause of inefficiency is much more important. Let us consider the case of a simple

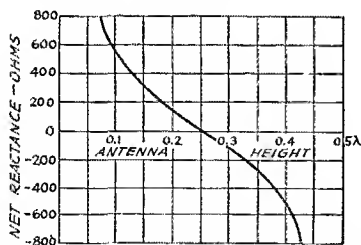


FIG. 1—NET REACTANCE REQUIRED AT TOP OF ANTENNA TO CAUSE CURRENT NODE AT BASE

vertical wire antenna $\lambda/8$ in height. Its radiation resistance is 6.8 ohms and the ground resistance, let us say, is 10 ohms. Let other losses be con-

sidered negligible. For every 100 watts of power fed into the antenna, then, $\frac{10}{10 + 6.8} \times 100$ or 59.5 watts are wasted in the ground, while only 40.5 watts are radiated. Now if we should by some means increase the radiation resistance referred to the base of the antenna to 200 ohms, we would find the power wasted would be but $\frac{10}{200 + 10} \times 100 = 4.75$ watts and the power radiated 95.25

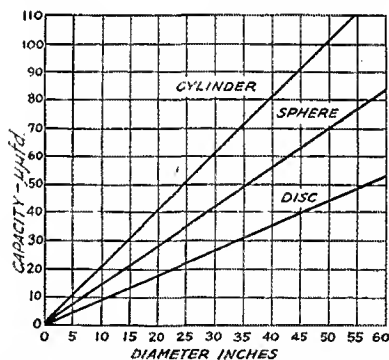


FIG. 2—CAPACITANCE OF SPHERE, DISC, AND CYLINDER (CYLINDER HEIGHT=DIAMETER) AS A FUNCTION OF THEIR DIAMETERS

watts. The radiated power has more than doubled and the field strength increased to 164% of its first value. It is seen that it is very much worthwhile, then, to increase the base radiation resistance; or, in other words, to lower the current in the ground lead.

The first expedient, and one which has been practiced commonly, is to erect a flat top on the antenna. The current is no longer zero at the top of the vertical section as it formerly was. The current at the base has been decreased somewhat, indicating that the base radiation resistance has increased. The ground losses will be less and the

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useful radiated power thereby increased. It is seen that if we could go all the way, and reduce the ground current to zero, all of the power put into the system would be radiated. It is the purpose of the system of antenna construction described here to achieve this condition practically.

TUNED TOP DESIGN AND ADJUSTMENT

A study of transmission line theory shows us that we must provide at the top of the vertical wire a suitable reactance to space so that the current distribution may be such as to obtain a current node at the earth. This reactance consists of a series inductance and capacity of the proper values to satisfy the equation

$$Z_2 = j Z_o \cot \theta = j(\omega L - \frac{1}{\omega C}) \quad (1)$$

where

Z_2 = top reactance

Z_o = antenna surge impedance

θ = electrical length of the vertical section (in degrees)

L = inductance at top

C = capacity at top

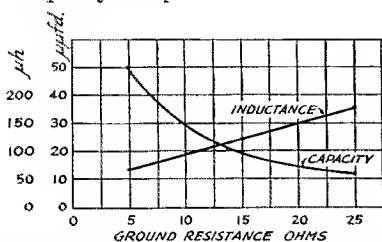


FIG. 3—CAPACITY AND INDUCTANCE REQUIRED AT TOP OF 3750-KC. ANTENNA FOR VARIOUS GROUND RESISTANCES TO REALIZE 75% OF MAXIMUM POSSIBLE SIGNAL STRENGTH WHEN USING INDUCTANCES WITH 0.005 POWER FACTOR

$\omega = 2\pi f$, (f in cycles per sec.)

This equation is presented in graphical form in Fig. 1 for $Z_o = 400$ ohms, which corresponds to a

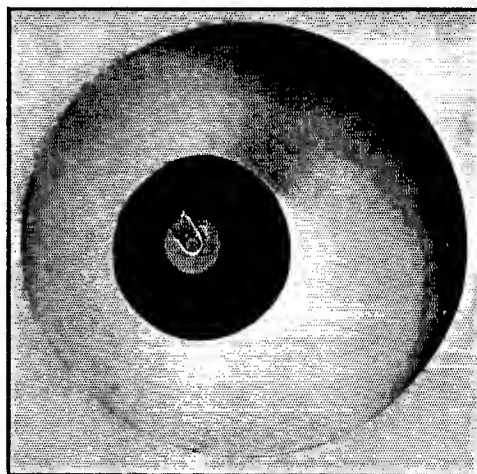


FIG. 4—CLOSE-UP BOTTOM VIEW OF SPHERE WITH COIL MOUNTED WITHIN IT, FOR PROTECTION AGAINST WEATHER, AT AMATEUR STATION W2ETH

wire 0.1 inch in diameter. This curve will serve closely enough for the average installation where the wire size is anywhere from No. 6 to No. 14. The curve shows the reactance required from the top of the antenna to space for antennas of heights up to a half-wave length.

The capacity part of the reactance is conveniently made up of a sphere, a disc, or a cylinder of metal. The capacities of these bodies may be easily calculated from these formulas:

1. Sphere $C = 0.56 d. \mu\text{mfd.}$
2. Disc $C = 0.354 d. \mu\text{mfd.}$
3. Cylinder $C = 0.802 d. \mu\text{mfd.}$

where d = diameter in centimeters. The cylinder is also d in height. One inch being equal to 2.54 centimeters, the capacity of a 20-inch sphere would be

$$C = 0.556 \times 20 \times 2.54 = 28.2 \mu\text{mfd.}$$

TABLE I (3750 kc.)

Ground Resistance Ohms	Coil Diam. Inches	Wire Size B & S Gauge	No. of Turns	Length of Winding Inches	Inductance Micro-henrys
25	2.5	20	90	6	178
15	3.5	14	64	8.5	122
5	9	0.25" tubing	29	20	70

TABLE II (1875 kc.)

25	5	14	90	12	356
15	7	8	64	17	244
5	18	0.25" tubing	29	40	140

TABLE III (7150 kc.)

25	1.31	25	90	3.15	93.5
15	1.85	19	64	4.5	64
5	4.75	3/16" tubing	29	10.5	36.8

The turns are spaced a wire diameter except those wound with tubing. A clip is provided for changing the inductance by shorting out turns from the end connected to the sphere.

Fig. 2 shows these capacities graphically for various diameters.

Where a sphere of inconvenient dimensions would be called for, a disc may be substituted conveniently. The wind resistance of a disc is almost negligible in comparison with the wind resistance of the equivalent sphere or cylinder. The spheres, discs, or cylinders need not be solid bodies, however, but may be made up of screening, well-soldered, or of a network of wires.

In order that losses in the inductance be kept within reasonable limits, the minimum size of the sphere required is quite definite. With inductances of 0.005 power factor (a reasonably good coil), the size of the capacitor should be at least as large as the one shown in Fig. 3. Of course the body may be made larger with improved results if desired. This curve is based on obtaining 75% of the ideal signal strength improvement possible for grounds of various resistances. It is very nearly exact for all heights of antennas. The curves are for 3750 kc., and twice these capacities must be used for 1875 kc.

The inductance value required is computed from (1), and Fig. 3 shows the inductance required when using the minimum capacity as shown in the same figure. This curve is for 3750 kc., twice this inductance being required for 1875 kc. The inductance coil must be

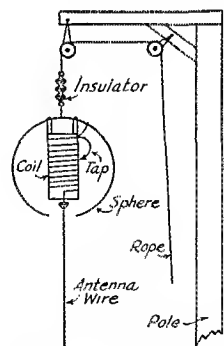


FIG. 5—CONNECTION DIAGRAM FOR TOP OF ANTENNA

to reduce dielectric losses; (3) making the physical size of the coil as large as convenient. A convenient diameter form is one about one-fourth the sphere diameter.

Tables I, II and III give the design data for

coils which will go within the spheres specified in Fig. 3 and correspond to the inductance values of that figure.

The diagram of connection at the top is shown in Fig. 5. An overall view of a completed antenna is shown in Fig. 6, this being the installation of C. A. Nickle, W2ETH, Schenectady, N. Y., the inventor of the antenna.

The antenna should be tuned in the following way: First, make up field intensity measuring equipment consisting of a battery-operated diode-rectifier, or a crystal rectifier, and couple this to a receiving antenna located about 300 to 1000 feet away from the transmitting antenna. A milliammeter should be provided for obtaining readings. In case no low reading milliammeter is available, a medium range d.c. voltmeter will sometimes give a good indication. As a last resort, a radio receiving set may be used as a measuring device, although care should be taken to see that no adjustments are made throughout the test which might affect the sensitivity.

Starting with zero turns in the coil, increase the turns one by one, recording the field strength obtained from each adjustment.

A point will be reached where a sudden drop in field strength is observed. The maximum field strength is found to occur just before this drop. It is well to leave the antenna coil adjusted a turn or so fewer than the maximum point. During this test care should be taken to see that the output of the transmitter is kept constant by always loading to the same plate current. The frequency likewise must not be allowed to vary. The latter may be checked against a standard oscillator by the heterodyne method. It will be found that a good coupling and tuning circuit at the base of the antenna, for the adjustment at the top for maximum signal strength, is a simple parallel tuned circuit, one side connected to the antenna and the other to ground. If an ammeter is used to indicate current, it should be placed in the antenna lead-in.

LINEAR TUNING

An alternative method of obtaining the inductance required is to make use of the properties of a transmission line. With an antenna system constructed as shown in Fig. 7a, it has been found that a position for the jumper *J* can be found which will give a maximum field strength. Note that no coil is used, the inductance looking into



FIG. 6—THE TUNED-TOP VERTICAL ANTENNA INSTALLATION AT AMATEUR STATION W2ETH

the line A-B being the inductance required. However, this holds only for antennas approximately a quarter-wave long. For antennas less than a quarter-wave but greater than an eighth, the jumper *J* must be replaced by a good induc-

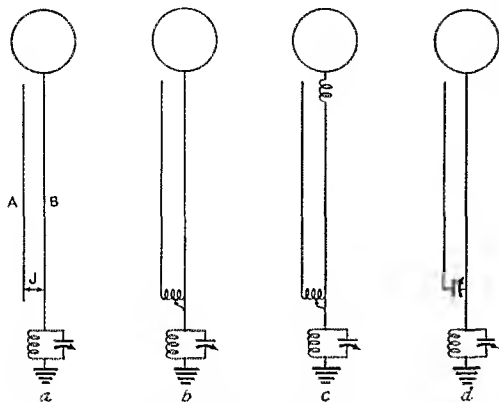


FIG 7—ALTERNATIVE METHOD OF OBTAINING SERIES INDUCTANCE

tance which is adjustable. This is shown in Fig. 7b. For antennas less than an eighth-wave, the inductance is best split into two parts as shown in Fig. 7c. Note that all of these methods permit easy adjustment from the ground. Fig. 7d shows the jumper *J* replaced by a variable capacitor; this arrangement is used for antennas between a quarter and three-eighths wave in length. For antennas from three-eighths to a half-wave, nothing other than the capacitor at the top is needed.

Fig. 8 shows the results of a test made on 7150 kc. Curve 1 is for a simple wire showing field strength vs. height of antenna for constant transmitter power. Curve 2 is for the same wire but with a 12-inch diameter sphere at its top with no inductance. Curve 3 is for the same sphere carefully tuned, with a series inductance, for maximum field strength. Note that the inductances and capacities required for 7150 kc. are 52.5% of those shown for 3750 kc. in Fig. 3.

The principles outlined here may be expanded in several directions. For instance, the inductance-capacitor combination may be used at the ends of horizontal doublets to increase their electrical lengths where physical lengths are restricted due to space limitation. Also, a sphere may be used at the lower end of a vertical antenna that must be operated where it is impossible to use a ground, as in mobile equipment.

While the writer has confined his description to the case where the current is reduced to a minimum at the base, W2ETH has found that an adjustment which gives equal current at the top and bottom of the antenna is desirable for some conditions. This adjustment is made using the same equipment as described, except that not

quite so much inductance is used as for the case where the current node is at the base. The angle of radiation is slightly higher for this adjustment. On the other hand, by increasing the inductance beyond the point required for minimum current at the base, the radiation can be made largely sky wave with but little ground wave. Such an adjustment will lessen local interference and will cause the reflected wave from the Heaviside layer to come to earth at a point closer to the transmitter and thereby improve transmission at an

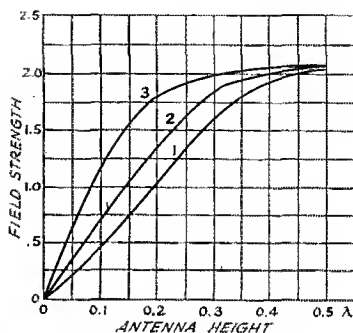


FIG. 8—FIELD STRENGTH IN HORIZONTAL DIRECTION OBTAINED WITH WIRE ANTENNAS OF VARIOUS HEIGHTS OPERATING (1) WITH NO LOADING; (2) WITH A 12-INCH SPHERE AT TOP; (3) WITH TUNED SPHERE AT TOP

Frequency, 7150 kc.

intermediate distance. The attenuation over longer distances, however, will be greater and this type of transmission therefore is restricted in its usefulness.

Strays

With reference to the "wired wireless" suggestion on page 62 of July *QST*, W2BRB writes that the following circuit constants have been found satisfactory for work over a distance of several hundred feet:

Coil—400 turns No. 30 on 2-inch diameter form.

Load tap (to line) 70 turns from ground.

Cathode tap 90 turns from ground.

Load condenser—0.05- μ f. paper condenser.

The 33, 38, 47, 2A5, and 59 tubes have been found to be satisfactory. R.f. pentode types do not work as well as the audio tubes. The energy radiated into space is very small—no more than that radiated by an oscillating detector. At the low frequency used no interference will be caused by the fundamental but occasionally a harmonic may land on a local broadcast channel. In such a case a slight shift in frequency will move it to a less objectionable spot.

Firing Up on the Newly-Opened Ultra-High Frequencies

Some Successful Experimental Gear for 2½ and 1¼ Meters

By Ross A. Hull*

FOR many years past, we amateurs have had only two ultra-high frequency bands in which to work. The five-meter band, of course, has been the scene of much splendidly successful experiment and communication. The three-quarter-meter band, however, has been virtually unavailable to the ham because of the lack of special tubes operable there.

All that is changed. The ham may now roam with fixed, portable or mobile equipment on any frequencies above 110 megacycles, and many of these frequencies are attainable with ordinary tubes in ordinary circuits. It seems certain that these new ultra-high frequencies will soon be swarming with amateur signals.

Our first bit of experiment in the new frequencies has revealed very forcibly the enormity of the territory available. It would certainly seem that we are to experience many difficulties in finding each other's signals unless we decide on some particular slices of frequencies for the first work. One plan which looks perfectly practical is to set aside two bands harmonically related to the present 56-mc. band and concentrate our activity in them for the time being. The first one would be 112 to 120 mc. ("two and a half-meter band")—the second one, 224 to 240 mc. ("one and a quarter-meter band"). Ordinary tubes can be made to work in both these bands and both of them offer tremendous possibilities for short-haul rag-chewing and experiment.

NEW GEAR OR OLD?

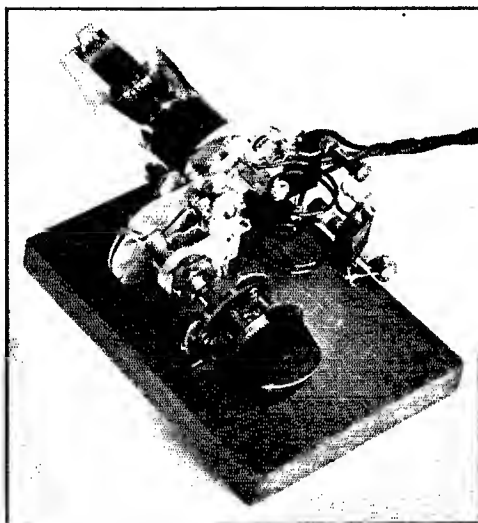
Our first thought in preparing to cook up some experimental gear for these bands was that maybe

we could modify some of the existing 56-mc. apparatus for the new job. As a result, we wound new coils for a standard transceiver and, after much struggling, obtained fairly satisfactory operation on 112 mc. It soon became obvious, though, that an entire re-arrangement of the oscillator portion would be necessary for really successful work even on that band—let alone the 224-mc. band. The high minimum capacity of the shunt tuning condenser used in most 56-mc. sets and the long leads used in the r.f. circuits made it almost impossible to get any appreciable concentrated inductance in the tank circuit. We do not suggest for a moment that it will be im-

possible to rig transceivers and the like so that operation can be had in both the 56- and 112-mc. bands. We only know that the problem needs more attention than we have given it.

OSCILLATORS FOR 112 MC.

The next step was to see just what a really effective 112-mc. oscillator would look like. To do this, about a dozen different oscillators were built. The first was a tuned-grid tuned-plate arrangement using a 53 and linear tanks tuned with a sliding bridge on both grid and plate tanks. Fig. 1 shows the circuit. The plate tank consisted of two copper rods seven inches long soldered directly to the two plate lugs on the 53 socket. The bridge was a piece of spring brass bent over the rods to give good contact. Experiment with the grid tank showed that a piece of wire bent into a "U" shape with 1-inch sides was about right. The arrangement worked well, but very careful adjustment of the r.f. choke was found necessary. With the choke turns spaced more or



AN EXPERIMENTAL TRANSMITTER OR RECEIVER FOR OPERATION BETWEEN 112 AND 120 MC.

A simple, low-powered unit built to prove that conventional circuits will still do a satisfactory job in the new ham territory.

* Associate Editor.

less than a certain degree the entire arrangement, power leads and all, constituted a powerful 20-meter oscillator. The circuit was, of course, unsuited for receiving because of tuning difficulties. Even the smallest tuning condenser across the two plates pulled down the permissible inductance seriously.

The next attempt was with the unity-coupled rig of Fig. 2. The plate coil was of $\frac{1}{4}$ -inch tubing 2 inches outside diameter and this, hitched directly to the two plate lugs of the tube socket provided oscillation on about 112 mc. Again we bumped into the tuning problem. One partial solution was to make the coil slightly smaller, then connecting a small tuning condenser not from plate to plate but across about an inch of the coil on either side of the center-tap. These two circuits were then rearranged for the use of two separate tubes—a variety of types being used. The chief result was to establish that any of the common tubes and any of the usual push-pull circuits can be made to operate on 112 mc. though some would seem to be more practical than others.

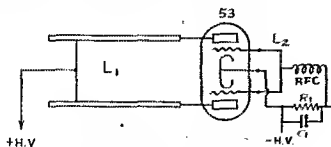


FIG. 1—ONE OF THE EARLY 112-MC. OSCILLATORS

L_1 and L_2 are described in the text. The r.f. choke consists of fifteen turns of No. 20 wire wound on a lead pencil—the pencil being removed. The grid resistor and condenser are 10,000 ohms and 100 μ fd. respectively.

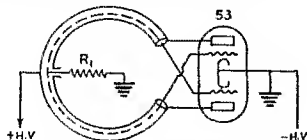


FIG. 2—A UNITY-COUPLED 112-MC. TRANSMITTER

Offering possibilities for experimental work, particularly in regard to a tuning system, this arrangement might well be given further attention. R_1 is 10,000 ohms or more. Other details are given in the text.

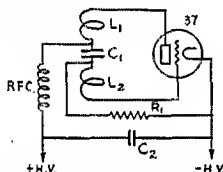


FIG. 3—THE CIRCUIT USED IN PRELIMINARY COMMUNICATION TESTS ON 112 MC.

L_1 , L_2 —A single $\frac{3}{4}$ -inch turn each of 14-gauge antenna wire.
 C_1 —100- μ fd. fixed condenser.
 C_2 —0.004- μ fd. fixed condenser.
 R_1 —10,000 ohms for transmission, 50,000 or 100,000 for reception.
RFC—Two feet of 28-gauge wire wound on a 1-meg. grid-leak form.
A 100- μ fd. condenser across R_1 may be found desirable.

THE ONE-TUBE CIRCUITS

At this stage we gave the conventional single-tube circuits a fling. The old favorite of Fig. 3 was highly successful. With the constants given, it gave excellent output on about 112 mc. and, for

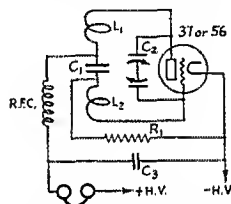


FIG. 4—THE COMPLETE RECEIVER CIRCUIT SHOWING THE SPLIT-STATOR TUNING CONDENSER IN PLACE

The constants throughout the circuit are the same as in Fig. 3 even though C_3 and C_2 were transposed by the draughtsman. C_2 is the special condenser described in the text and illustrated in Fig. 5. A 100- μ fd. condenser across R_1 may be found desirable.

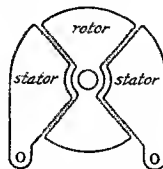
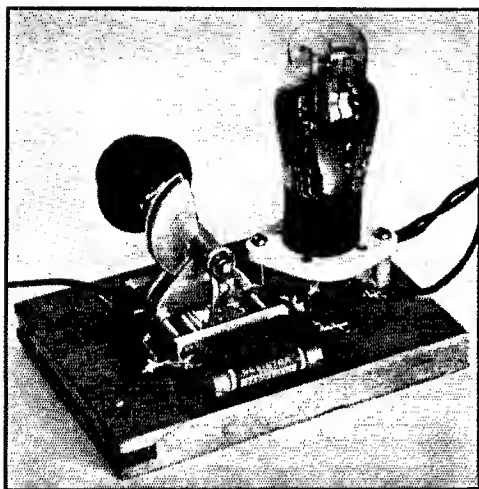


FIG. 5—THE SPECIAL CONDENSER PLATES FOR THE CIRCUIT OF FIG. 4

reasons yet to be discovered, proved much more stable and "sure-fire" than the arrangements used previously. But again came the problem of tuning. An attempt was made to tune by using a variable condenser for C_1 . This gave a limited tuning range except toward the minimum settings of the condenser and at these settings oscillation became somewhat unreliable. The same effect was noticed in the 56-mc. receivers of a few years ago.

In an attempt to retain the popular shunt-tuned circuit of Fig. 4 a special type of tuning condenser was evolved—a condenser which would provide a very low minimum capacity and a short path from one terminal to the other. The idea behind the condenser is shown in Fig. 5. Two rotor plates of the shape shown and two stator plates were cut from aluminium and mounted on the frame of a National Type STHS midget condenser. The diameter of the circle on which the stator plates were cut is $1\frac{1}{2}$ inches. With the usual plate spacing provided by the original washers on the rotor shaft, this condenser gave a tuning range from about 110 to 135 mc. Its minimum capacity proved to be very low—the frequency of the oscillator being lowered to only the slightest perceptible degree when the condenser was hitched in place. Such a condenser is, of course, not essential for 112-mc. work, but it would seem likely that some sort of low minimum



THE 224-MC. TRANSMITTER OR RECEIVER SHOWN IN FIG. 7

This type of equipment, especially if provided with condenser stator plates of special design, would seem likely to provide one solution to the problem of providing a tunable oscillator for the frequencies between 224 and 240 megacycles. The 100- μ fd. condenser across the grid resistor is not shown in the circuit and is not always an essential.

capacity and short path condenser will become popular.

The arrangement of Fig. 4, then, is the most effective of all the arrangements tried for either transmission or reception on 112 mc. As a receiver, the tube super-regenerates splendidly with a grid resistor of 50,000 or 100,000 ohms. Antenna coupling may be provided either with a very small condenser connected to the grid of the tube or, preferably, with a single-turn antenna coil mounted between L_1 and L_2 . The most desirable tube so far operated in this rig is the 37 for transmission and the 76 for reception. Even with 400 volts at 40 ma. the 37 still seems willing to accept the consequences—and has for a dozen hours or so.

Fig. 6 shows another slightly different type of oscillator which shows great promise—particularly for the still higher frequencies. In this case, the inductance consists of two copper strips S_1 and S_2 mounted on stand-off insulators and connected to grid and plate of a 37 tube. For 112 mc. the strips were 1-inch wide and 15 inches long, spaced about $\frac{1}{2}$ -inch. Tuning is accomplished by sliding a copper plate P over the ends of the strips and about $\frac{1}{16}$ -inch above them. Some decent mechanical arrangement for mounting and sliding this plate is yet to be provided. The affair works well, however, and offers definite promise. The tuning effect is obtained, as will be guessed, by shorting the strips as far as r.f. is concerned by the capacity between the strips and the plate.

A 224-MC. OSCILLATOR

This scheme for a transmitter is really the outcome of the experimental 224-mc. rig shown in Fig. 7. The idea was to use two stator plates of a split stator condenser for the tank inductance of the transmitter or receiver. This particular condenser was built by dismantling a National SEU 20 condenser (it is the one with four very heavy gauge plates) and mounting each stator plate on a separate pair of machine screws. One end of these plates was connected to grid and plate of a 37 tube, the other ends being by-passed with a midget 100- μ fd. condenser. The actual circuit is, of course, the same as that of Fig. 4 or 6. Dizzy contraption that it is, the thing oscillated well on about 230 mc. and could be tuned to higher frequencies by meshing the rotor plates with the stator plates—the reverse of what one would expect at first thought. Incidentally, to reduce the lowest wave-length at which circuit will oscillate it is only necessary to reduce the spacing between the stator plates—though possibly this would hold good over only a limited range of plate spacings. Here, though, is a thoroughly practical and smoothly tunable 224-mc. band transmitter or receiver!

Limited time has made it impossible for us to

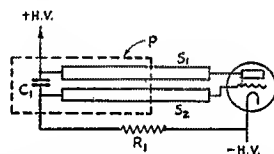


FIG. 6—AN ULTRA-HIGH FREQUENCY CIRCUIT INVOLVING A NOVEL TUNING SYSTEM

C_1 and R_1 correspond to those in Fig. 3. Other details are given in the text.

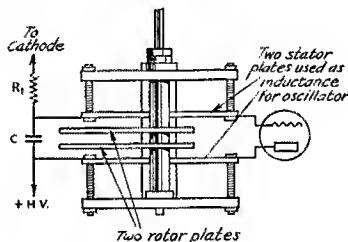


FIG. 7—BELIEVE IT OR NOT—A 224-MC. TRANSMITTER

In this rig the condenser serves both as the inductance and the tuning element.

do much actual communication with these rigs with the idea of discovering how these new (to us) frequencies work, but it seems that we can at least expect a performance closely similar to that of 56 mc. One great advantage that the new bands offer is that highly directive antennas can be built without getting a very clumsy structure. And directive antennas for both transmission
(Continued on page 88)

With the Affiliated Clubs

WEBSTER'S definition of a club is "an association of persons to promote a common object, or for good-fellowship."

How well this applies to our A.R.R.L! American Radio Relay League members are in reality members of a huge amateur radio club; the unfortunate thing is, however, that the members of this club are too widely scattered ever to hope to get together for unified meetings. How, then, are these club members to get together? You all know the answer: Aside from contacts "over the air," A.R.R.L. conventions and hamfests make possible a certain amount of personal contact between members, but these are only occasional affairs and do not occur with any fixed regularity in every section of the country. The real mediums for personal contact between A.R.R.L. members are the A.R.R.L. affiliated clubs. These local groups (for affiliated clubs are for the most part groups of amateurs from their own local areas) meet regularly weekly, bi-monthly, monthly, etc., and are composed essentially of A.R.R.L. members; a meeting of any affiliated club is, we might say, a local meeting of A.R.R.L. members. This is true to-day more than ever before, for at its 1934 annual meeting the Board of Directors, A.R.R.L., set forth a new policy concerning club affiliations. This policy was explained in the report of the Board Meeting (June QST), but we are repeating it here for the edification of club members who may have missed it heretofore. Every member of an affiliated club should be familiar with this new ruling.

RE: CLUB AFFILIATION WITH A.R.R.L.

At the 1934 meeting of the A.R.R.L. Board it was voted: (a) that it is the policy of the League not to grant affiliation to any amateur society unless the articles of the applicant society lodge the control of its affairs in licensed amateurs; nor unless 60% of the licensed amateurs belonging to the applicant society are also members of the League; (b) that the communications manager is directed to make a suitable survey of the affiliated clubs at the end of each year; and (c) that it is the policy of the League to terminate the affiliation of any society found by such survey not to comply with these conditions. This simply means that the articles of any given club must be so written that control of its affairs is vested in licensed radio amateurs, and that at least 60% of these licensed radio amateurs must be A.R.R.L. members. Officers of clubs now affiliated should take immediate steps to assure that their club constitution and by-laws are in accord with these requirements. Officers of clubs wishing affiliation

should, with their applications, give the language of the articles, the calls of licensed amateurs and the names of League members.

The wording in the constitutions of three active clubs relative to the "licensed amateur control" clause may be of assistance to other clubs in lining up the necessary changes in their constitutions: *The Sheridan Amateur Radio League (Wyoming)* does it this way:

"Only licensed amateurs may vote on any question or for any officer in S.A.R.L."

The San Diego Radio Amateur Association words it thus:

"Members shall be of two kinds, Regular and Associate. Regular members shall be in possession of a valid amateur radio operator License. Associate members shall be those not in possession of such a license who have a genuine interest in Amateur radio. Upon application, candidates may become members by a majority affirmative vote of the members present at the time of application. Only Regular members shall be entitled to vote upon any matter which concerns the business or opinion of the organization. Only regular members shall be eligible for office."

The Indianapolis Radio Operators Club has amended its constitution as follows:

"Members. There shall be three classes of members, Resident, Non-Resident, and Junior. The non-resident members shall be those residing outside of Marion County. The membership shall include only persons who hold an amateur operator's license. They shall be of good moral character, and if their station is inactive for a period to exceed six months they shall be dropped from the club automatically. Junior members shall have no voting rights."

These are but three examples of wording to comply with the Board's "licensed amateur control" ruling. A possible change to the third example might be to define junior members as those not holding amateur operator licenses and with no voting rights. The exact wording is, of course, up to the decision of each individual club, and may best be determined by discussion at the club meetings. The ruling concerning 60% A.R.R.L. membership of the licensed amateurs controlling club affairs speaks for itself.

CLUB ACTIVITIES

The great outdoors is claiming most club activities at this time of year! Hamfests, field days, picnics, 56-mc. work, portable tests—with all these outdoor doings we find clubs keeping the ball rolling throughout the summer. Then, as usual, we find the club workshops showing signs of the rebuilding fever, which the QRN-days always bring to light. We are reminded of an incident recounted to us by W3AAJ, *Richmond Short Wave Club*. It seems that a bunch of club members were recently enroute by automobile to a hamfest some miles away. In true ham fashion they had rigged up 56-mc. gear on each car. As

the leading car would reach the top of a grade or round a particularly "dangerous" curve, the chap operating the 56-mc. gear would signal the rear cars, "Road clear ahead. Open her up." Whereupon the other carloads of hams would forge ahead past any other cars on the road, much to the wonderment and consternation of the regular tourists! There's an idea for some 56-mc. fun, especially when there are several cars in the party, but we don't recommend it. Safe enough with amateur radio, it violates most traffic laws and the cops won't appreciate the stunt. Hi!

Some years ago Mr. I. Creaser, WIBSJ, prepared a paper, "Why Does the Radio Amateur Need an Association?" The contents of this paper apply just as well to-day as they did when WIBSJ wrote it. He said, "One of the essential purposes of a radio organization is to serve the amateur by supplying him with those things which he needs in the way of advice, that he may derive the greatest pleasure and benefits along with his own efforts." He went on to point out eight essential principles for proper organization: unity of purpose; common aim; coöperation; specialization; instruction; learning; leadership; and action. How does your club shape up?

A low-power contest is being arranged for the month of September by the *Providence Radio Association, Inc.* The rules for this contest may offer suggestions to other clubs for a similar activity: Total points for each contact will be computed by multiplying watts input by miles covered by band used. The scoring for watts input will be taken from the transmitter stage having the greatest watts input and will range from one point for 10 watts to ten points for one watt. Similarly, scoring for miles covered will vary from one point for zero to 100 miles up to ten points for more than 3000 miles. Scoring for the band used will be as follows: Eight points for 1.75 mc.; four for 3.5 mc.; two for 7 mc.; one for 14 mc., and two for 28 mc. There will be first and second prizes.

ATTENTION, CLUB SECRETARIES!

It is hoped that this "With the Affiliated Clubs" section of *QST* can be a regular feature. To a great extent its continuance depends upon your coöperation by sending us news. We desire to make this a chronicle of particularly interesting affiliated-club activities. We won't have room to report ordinary meetings, but information on unusual activities, especially of the type which might benefit other clubs, is earnestly requested.

VISIT THE CLUBS

A good many hundred amateur radio clubs throughout the United States and Canada are affiliated with A.R.R.L. At headquarters we have recorded the addresses of these clubs, their places and times of meeting. Clubs are splendid

places to get acquainted with other amateurs and to participate in interesting discussions on amateur radio. Do you want to be put in touch with a club in your vicinity? Would you like to attend a club meeting in another city you are visiting? Address the Communications Manager (enclosing 3¢ stamp, please) for data on Affiliated Clubs in your vicinity.

—E. L. B.

A.R.R.L. 28-Mc. Contest Rules

1. The Contest is open to all licensed radio amateurs.

2. The Contest will commence at 0001 GT October 1, 1934 and will conclude at 2400 GT September 30, 1935.

3. Licensed power must not be exceeded.

4. Contacts may be established at any hour and on any day during the contest period.

5. One point will be scored for each completed 100 miles of contact, with a specific station (e.g. a contact with a station 99 miles away scores no points, contact with a station 658 miles away scores 6 points). All distances will be measured by a Great Circle line between stations.

6. In computing his final score a competitor may claim points for each different station worked once during each calendar month.

7. Proof of contact in writing may be required by the contest committee.

8. Re R.S.G.B. Award: (a) A minimum signal strength of QSA 3 must be recorded before a contact counts for points. (b) The decision of the president of the R.S.G.B. will be final in all cases of dispute. (c) Entries must reach the Secretary, R.S.G.B., 53 Victoria Street, London, S.W. 1, not later than November 15, 1935.

9. An A.R.R.L. Award Committee shall consider the file of reports and data submitted by competitors to the A.R.R.L. Its decision will be based on: (1) The number of weekly reports to A.R.R.L. on 28-mc. work, 25%. (2) Equipment description and development work on same, 25%. (3) Number of points in accordance with Rule 5, 50%. Examination of all reports with ratings weighted on these factors will determine the 28-MC. ACHIEVEMENT AWARD. Entries (from W/VE) must all be received at A.R.R.L. on or before Oct. 15, 1935, to be considered for the A.R.R.L. Award.

A bronze charm will be presented by the A.R.R.L. engraved "FOR 28 MC ACHIEVEMENT OCT. 1, '34-SEPT. 30, '35", and with the call of the winner. One point will be scored for each completed 100 miles of contact. Decision between W/VE competitors will be based on weighted credits. (1) The number of weekly reports to A.R.R.L. on 28-mc. work, 25%. (2) Description of equipment, and development work reported on same, 25%. (3) The number of points

(Continued on page 49)

Another Simple Solution of Break-in

Its Practical Application in the Crystal-Controlled Transmitter

By Ludlum Smith, W6BJM*

IN THIS enlightened era of horseless carriages and low-cost crystals, where all one hears is "break-in," the lowly ham who would benefit by all three is up against a rough proposition. As long as a self-excited oscillator was the height of something-or-other, break-in could be affected after a fashion by pushing the phones as far forward on the head as possible and letting nature take its course. This little stunt may or may not have been hard on the phones, depending on the power of the transmitter, but it certainly wasn't any too satisfactory. At any rate, the increasing prevalence of crystal control has changed things considerably. The customary amateur receiver is still either a detector and one-lung or a tuned r.f.—greatly re-vamped, to be sure, but the same old story, nevertheless. On the other hand, it is usually impossible to use the receiver at all with the crystal oscillator running in the same band, without resort to an extensive shielding campaign.

So it is that, to the amateur not having the facilities of R.C.A., break-in is a compromise at best. As long as the transmitter and receiver are both located at the same place, the transmitter must stop during reception and the receiver must be off during transmission. There's no getting around that. Even with a "sniggle-sniggle," when working close to the transmitter's frequency, such must be the case. In high-speed work, with a bug screwed up to the last notch, complications are bound to set in.

The object of this article is to describe such complications and to explain the method by which each was overcome as it presented itself. The solutions to these problems are not difficult, nor do they require a great amount of originality. In fact, very few of the ideas to be presented found their origin in the writer's mind. Rather, they are an accumulation gained by observing other amateurs' methods and moulding them into a satisfactory unit. Incidentally, most of these ideas have been previously described in *QST* from time to time and may or may not have been taken advantage of already by the reader. As to outlay of cash, nearly all required parts should be lying around the shack somewhere, or should be easily available by the customary recourse to "swap." Let it be said that those were the only two methods used here.

By keeping one eye on the accompanying

diagram as you read what follows, the "modus operandi" is easily comprehended.

Let us take the first step toward *good* break-in operation. When the key is pressed, the receiver must cease to function—at least as far as the ears are concerned. This disabling may be accomplished to a greater or less extent by one of three methods; the antenna may be grounded, the plate supply disconnected, or the phones disconnected. In actual practice only the last is easy on the hearing, and then only when breaking the phone circuit does not open the plate supply. In other words, the phones must be connected to the last audio stage either through a condenser and impedance arrangement, or with an output transformer. This works in very conveniently with what is to follow since one side of the phones may be connected to ground. Probably the easiest parts to obtain are an audio transformer (with the primary and secondary in series for use as an impedance) and a coupling condenser of whatever capacity is available—somewhere between 0.1- and 1- μ fd. Experience has shown that regardless of what values the parts in diagrams have tacked on them, the value actually used is the one at hand—and it usually works, which is more to the point. When this much is finished, it will be found that the phone circuit may be closed and opened as rapidly as necessary without the slightest aural discomfort. In fact, were it not for the background and signals, it would hardly be noticed.

The output lead from the receiver is brought to a double-contact relay, and connected to that contact which normally closes the circuit when the relay is open—that is, when the field is unexcited. The phone jack is connected between the relay armature and ground. Thus the phones are normally in a position to receive signal impulses from the receiver. The relay field is operated in parallel with field of the transmitter keying relay. It is hardly practicable to utilize one relay with enough contacts to do both jobs, since the receiver circuit is likely to be some distance from the other; if not, and a suitable relay is at hand, the individual can work it out for himself.

Now, after the key has been jiggled up and down awhile, the utter blankness that is encountered when the key is down may be found to interfere with the ability of the operator to send clearly. Most of us like to hear something when we send, for obvious reasons. It is therefore necessary to hook up some kind of sounding device to the

* 20 Hillside Ave., San Anselmo, Calif.

other relay contact so that the 'phones will be connected to it during the interval of sending. At first glance this might look like an excellent opportunity to drag in the freqmeter-monitor and arrange matters accordingly. But not so! We still want to work on the frequency of the transmitter occasionally. While it might be a good idea to go a step beyond the ones described here, and use a change-over switch so that the monitor can be connected in place of the audio oscillator when desired, for practical purposes the audio oscillator alone is the best bet. No description of that particular breed of animal is needed, save that it would be worth while to replace the off-on filament switch with a rheostat in order to vary the tone. If a fixed note is desired, a carbon resistor of suitable value may be inserted in the grid. Note that the plate return *must* be made through a common ground. In other words, the positive lead of the battery is grounded. This will be a terrific shock to the lads who have grounded the negative from time immemorial.

Perhaps a word on the intricacies of the relays would be helpful. If the only ones available have but one set of contacts, try putting on an extra insulated one, arranged so as to make contact with the armature when the field is open. Usually an old "B" supply or "eliminator" will have a relay with two contacts already on it. If the resistance of the field is too low it's a simple matter to rewind it with what it will hold of No. 26 or 30 enameled wire. A nice fat condenser across the key will add that final touch and soak up the juicy spark from the induction of the relay fields every time the circuit is opened.

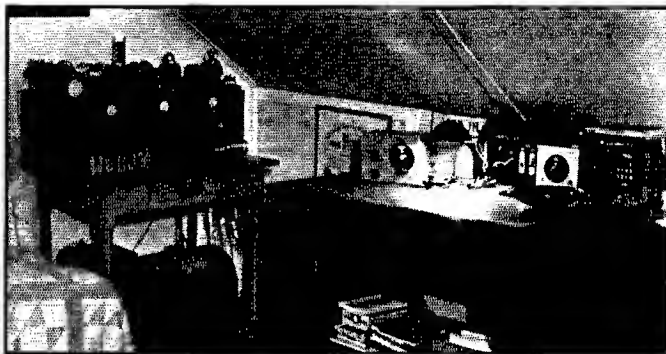
KEYING THE TRANSMITTER

Comes now that source of joy and cause of curses, the transmitter. If it's a simple self-excited oscillator that part is practically over; but if its owner has been on the air a year or more, it probably isn't, so the fun is just beginning.

The sad, sad part of playing this break-in game is that after going to all the trouble of building up an m.o.p.a. rig, the mind must be made up that the old keyed oscillator isn't so bad—especially if it uses a crystal instead of a grid coil and has one or more succeeding amplifier stages. In fact it's pretty good. After listening to a few of them on the air it will be decided that it is equally as good, if not better, because the only apparent difference is that it is naturally impos-

sible to hear the crystal running when the key is up. For some reason many an amateur has a certain abhorrence of the idea of keying the crystal stage, perhaps because he just hasn't done it. Against that type of reasoning there is no argument other than that if the doubtful lad will try it once he will soon see the error of his ways.

Before any more ground is covered it might be



THE AUTHOR'S STATION, W6BJM, WHERE HIS SIMPLE SOLUTION OF BREAK-IN IS APPLIED TO THE TRANSMITTER AT THE LEFT

The stage line-up is 47 crystal oscillator, 46 buffer-doubler and 211 final, the latter customarily doing business on the 3.5- and 7-mc. bands with 175 watts plate input. The operating position, with receiver and whatever, is at the right. Not to be overlooked, under the table, is the mimograph from which pours "that masterful rag, QSA5."

wise to state that such a stunt should *not* be tried with the crystal running "free"; that is, without the rest of the transmitter coupled to it. When this is done it usually sounds like a very poor self-excited rig with crystal control—if such a thing can be imagined. The only way to try the experiment is to be sure the transmitter is properly tuned and neutralized, arrange some sort of fixed grid bias for all amplifier stages, and connect the keying relay to the center tap of the oscillator. One trial will convince the wildest skeptic.

For those who are horrified at the mere mention of interrupting the oscillations of the crystal stage, suppose we compare it with the conditions existing in its normal operation.

The crystal is or is not temperature-controlled. In either case it is customary to start and stop it whenever desired without serious effects on the frequency stability. Of course, it must start without such coaxing as running over and rapping the holder with a pencil, axe, or whatever the operator happens to have in his hand at the moment. The oscillator must not be loaded so heavily that one wonders how it works at all. Whether starting and stopping it at normal keying speeds will affect the crystal's frequency stability more than, or as much as, running it continuously is something for the engineers to figure out. It certainly does not change it enough to be noticeable in a monitor. It might be a good idea to bear in mind that the oscillator is not the

final amplifier, and to curb the urge to put a couple of thousand volts on it. After all, when one breaks down and confesses, very few amateur transmitters, temperature-controlled and all, have a great deal in common with WWV; and it's a pretty fair bet that the old rig will stay just as close to its supposed frequency when the oscillator is keyed as when it is the final that makes the transmission more or less intelligible. Last and not least, it's sure death on key-clicks.

Crystal keying is really more prevalent than some might think. It was only after working five or six of the best signals imaginable and having the operators say something to the effect, "... keying crystal hr . . .," that it was considered.

grid bias (without excitation), which means fixed bias by one of three methods:

- a. Battery bias.
- b. Battery and resistance bias, or
- c. A rectifier-filter grid-bias unit. (Power supply.)

Which is used is up to the individual. But the installation of a grid-bias power pack with a good healthy bleeder resistor will give the closest adjustment of grid-bias voltage; and when it is properly installed the amplifier tubes are just as well protected against accidents causing excessive plate current as when battery bias is used. And the pack doesn't take up as much space.

The installation of battery bias needs no description, but a grid bias unit is quite a different proposition. The one shown in the diagram is just an ordinary power supply except that no power is delivered outside its own circuit. It should deliver about 300 volts at 50 milliamperes to the bleeder resistance, which is the sole load. The relay field in series with this load must pick up its armature very definitely at that current. Of course these figures are not iron-clad, and the individual can work out any arrangement that fits his conditions satisfactorily. The main idea is that the load must have a low enough resistance to pass sufficient current to allow the relay to

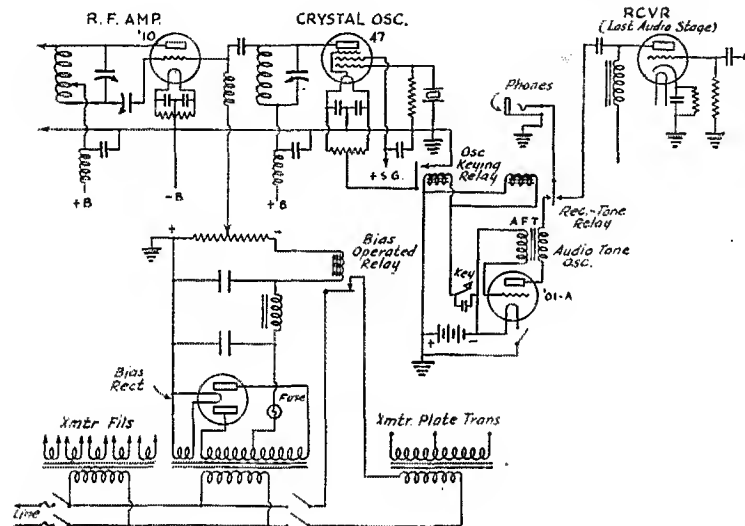


FIG. 1—THE BREAK-IN ARRANGEMENT FEATURES CRYSTAL-OSCILLATOR KEYING, RECEIVER OUTPUT SWITCHING WITH AUDIO TONE SIGNAL, AND AUTOMATIC BIAS PROTECTION

Circuit constants typical, nothing especially critical.

The last straw was an exceptionally fine rag chew with W9AAB, who said, "Too bad ur not keying xtal. We cud use bk-in. Why don't u try it?"

Well, that's enough of that. Let's take a peck at the conditions which must be fulfilled to do the trick satisfactorily.

(1) The crystal must be a fairly stable oscillator. If it isn't it's no good anyway. Either a good X- or Y-cut rock, in a proper mounting, seems to operate as well as ordinarily, and three or four hundred volts on the plate ought to be enough to drive the next stage decently without running the risk of damaging the crystal.

(2) All succeeding stages must be sufficiently neutralized to preclude the possibility of any one of them breaking into oscillation.

(3) All succeeding stages must have cut-off

close, and it must be a heavy enough resistance to dissipate safely the power lost in it. At the above figures a 75-watt 6000-ohm wire-wound resistor is used, with taps that can be scooped up and down freely and easily, allowing for very close adjustment of grid voltage. Incidentally, although this is another time when the positive is grounded, nothing has blown up as yet.

By another quick glance at the diagram it is seen that upon closing the filament switch the bias unit is also started up, but that closing the plate switch has absolutely no effect until said unit is operating satisfactorily. By the same token, should anything occur to disrupt the operation of the unit, the bias-circuit relay, which has suddenly assumed the impressive name of

(Continued on page 80)

This Voltage Divider Business

Reducing the Design Problem to a Simple Process

AMONG the irritants that return to plague us at least once in every so often is the problem of figuring the resistor values for the voltage divider of a plate power supply. We were reminded of this little matter on a sultry day, recently, while sitting with H. T. Hayden, W2FO, in conversation on life's little problems in general and those of hams in particular. It wasn't at all illogical that the question should arise, either, because W2FO, in his work with Ward Leonard, has been called upon to work out almost every conceivable combination in voltage dividers; hundreds of them, in fact.

"It's surprising," said he, "how many amateurs—and engineers, too, for that matter—seem to be completely stumped when it comes to figuring out even the simplest kind of plate-supply voltage divider, although it's really one of the easiest jobs in the world—provided you know Ohm's Law and start in the right place."

"Then, it's high time we had it," said we. And here it is.

* * *

First of all, let's make sure that everybody has Ohm's Law straight. You say everybody knows it? Well, we'd like to believe that every amateur is completely familiar with this simple relationship between voltage, current and resistance—the cornerstone of all electrical and radio calculations—as it is given in Chapter Three of the *Handbook*, for instance. But we have our suspicions.

Only recently we were told that an inquiry to a representative group of radio servicemen, many of whom are amateurs, revealed that the majority did not know Ohm's law and could not apply it to a practical problem! Perhaps an all-amateur group would make a better showing; but just to be on the safe side—

$$\text{Current} = \frac{\text{Voltage}}{\text{Resistance}}; I (\text{Amps.}) = \frac{E (\text{Volts})}{R (\text{Ohms})}$$

And the other practical forms in which we shall have occasion to use this relationship in connection with voltage divider design:

$$R = \frac{E}{I}; \text{ and } E = IR$$

Since the current value, I , must be in amperes, the usual milliamper values must be converted to decimal fractions of an ampere in making the calculations. (100 ma. = 0.1 amp., 10 ma. = 0.01 amp., etc.)

Now for the second important point—starting at the right place. The wrong place to start is at the positive end of the divider. The *negative* end is the right place to start. Then, knowing the value

of the resistor bleeder current, the voltage delivered by the power pack, and the current and voltage values at each tap, the rest is easy. Let us take a typical problem to illustrate the method.

As diagrammed in Fig. 1, our divider is to deliver 750 volts at 40 ma., 500 volts at 50 ma., and 300 volts at 20 ma. from a 1000-volt rectifier-filter system. Now for the purpose of designing the divider the current delivered from the 1000-volt terminal is of no importance except in so far as it may affect the power supply voltage regulation. But it is essential that the current drawn from each of the taps on the divider be known, at least to a close approximation. The bleeder current is chosen as 15 ma. in this case, which is a fair value.

The resistance values for the individual sections are calculated in the alphabetical order shown, beginning with section A at the negative end. The voltage across this resistor will be equal to the voltage indicated for the first tap, 300 volts. Since the only current that flows through section A is the bleeder current of 15 ma. (0.015 amp.), the resistance value will be

$$R_A = \frac{300}{0.015} = 20,000 \text{ ohms.}$$

The current through section B will be the bleeder current plus the 20 ma. taken off at the 300-volt tap or 35 ma. (0.035 amp.) The voltage across B is, of course, the difference between the voltages at its ends; that is, 500 volts minus 300 volts, or 200 volts.

$$R_B = \frac{200}{0.035} = 5714 \text{ ohms (5700 O.K.)}$$

The resistance of section C is similarly calculated, the current through it being the bleeder current plus the current to each of the taps below it, or 85 ma. (0.085 amp.)

$$R_C = \frac{250}{0.085} = 2941 \text{ ohms (3000 O.K.)}$$

Finally, the resistance of section D is calculated, the current through it being the bleeder current plus the current to all the lower-voltage taps or 125 ma. (0.125 amp.)

$$R_D = \frac{250}{0.125} = 2000 \text{ ohms.}$$

DISSIPATION AND VOLTAGE RATINGS

Now it isn't enough to know just the resistance values in order to pick the resistor units for the divider. You must know also the power dissipa-

tion rating required of each unit. We must remember that, while we may think of the resistor in terms of its voltage drop, it is actually a power-consuming device; and that all the power consumed is converted to heat which must be

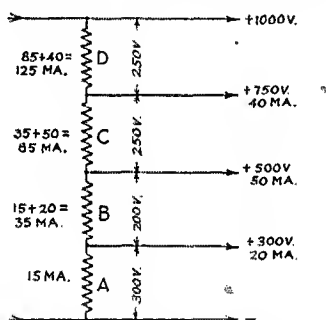


FIG. 1—PROBLEM: DESIGN A VOLTAGE DIVIDER
It's one of the easiest jobs in the world—provided you know Ohm's law and start in the right place.

dissipated by the resistor. This power is equal to the voltage across the resistor multiplied by the current through it. That is,

$$P \text{ (watts)} = E \text{ (volts)} \times I \text{ (amps.)}$$

Alternatively, the power is equal to the resistance multiplied by the square of the current,

$$P = I^2 R$$

Figured either way, the answer will be the same. Taking the voltage and current values, the very minimum dissipation ratings required of the resistors of our example will be as follows:

$$P_A = 300 \times 0.015 = 4.5 \text{ watts}$$

$$P_B = 200 \times 0.035 = 7.0 \text{ watts}$$

$$P_C = 250 \times 0.085 = 21.25 \text{ watts}$$

$$P_D = 250 \times 0.125 = 31.25 \text{ watts}$$

At this point it is advisable to say something about the dissipation ratings given to resistors by their manufacturers. Since the power is dissipated in heat, it is logical that the dissipation rating should have temperature rise as its basis. As standardized by the Radio Manufacturers Association, the National Electrical Manufacturers Association and the National Board of Fire Underwriters, the full rating of a wire-wound vitreous enameled type (the type generally used in voltage dividers) is the load in watts which will produce a temperature rise of 250° C (482° F.) at the hottest spot of a two-terminal resistor when it is suspended in air at least one foot away from the nearest object and when the temperature of the surrounding air does not exceed 40° C. (104° F.).

It is obvious, of course, that the normal rating assigned to a resistor on this basis will be lowered when the resistor is crowded with other apparatus, or other resistors, or where the temperature of the surrounding air runs higher than 104° F. It is, therefore, a safe rule to choose a resistor having a full dissipation rating of twice the calculated power dissipation, at least for the applica-

tions usual in amateur equipment. Although resistors may be overloaded within reasonable limits for short periods of time, it is wise economy to avoid doing so by picking a resistor of adequate dissipation rating.

Another factor entering into the safe life of resistors is the voltage across each unit. Insulation between turns of the wire-wound resistors is likely to break down if the voltage should be excessive. One leading manufacturer recommends that there should be not more than 500 volts between the end terminals of a radio-type resistor unit, although admitting that this voltage can be exceeded with impunity in many cases. We know, of course, that 1000 volts have been used across resistors with impunity, if not with complete safety, in many instances, particularly with a resistor of the long skinny type that has more turns per volt.

CHOOSING RESISTOR UNITS FOR THE JOB

Now that we know the resistance, dissipation and voltage-drop values for our divider, the final step in the design process is to pick out the resistors themselves from a list or catalogue of commercially-available types. It becomes immediately apparent that standard units exactly meeting the specifications are not available in every instance. This calls for the exercise of a little personal judgment. After all, as we have learned, successful engineering is about 10% mathematical design and about 90% smart estimating.

In our present problem the A and D sections happen to have round-number resistance values that can be picked right from the catalogue. For A there is a 20,000-ohm 10-watt type listed, while for D we can choose a standard 80-watt 2000-ohm type. But sections B and C are not readily satisfied by any standard types we find listed. A 3000-ohm unit would be satisfactory for C; but both B and C together could be taken care of by a single unit having adjustable tapping bands. A safe choice would be one of 160-watt size having a total resistance of 10,000 ohms. Two tapping bands would be used, one set 5700 ohms from the negative end and the other 1300 ohms from the positive end. In adjusting a band, incidentally, be careful to loosen the clamping screw so that the contact point does not drag on the bared resistance wire when the band is moved. Otherwise the wire may be broken and the resistor spoiled.

THE FINAL SET-UP

In assembling the divider, take reasonable care to allow as much clear space around the resistors as may be available so that there will be free circulation of air to provide cooling. In no case should a resistor be jammed up against a

(Continued on page 78)

Sixth International Relay Competition Results

AN A.R.R.L. DX tournament is always an "Open Sesame" for the radio amateur, bringing new thrills in distance work, new friendships in all corners of the world, and operating enjoyment unexcelled. The Sixth International Relay Competition, March 10-18, 1934, was no exception, breaking all previous DX contest records, both from the standpoint of participation and from accomplishments.

Pages could be written on the magnitude of the "Sixth International," orators could talk at length on the wonders of present-day radio distance work, but actions speak louder than words—take a look at the list of scores rolled up in this contest!! Forty-eight operators made over 10,000 points! W3ZJ set a new high record for DX competitions with a score of 32,879 (QSO's with 237 stations); his is an enviable achievement!! NY1AB (operator Vandekamp) came out of the encounter with the highest score outside of the United States and Canada—25,648! This represents QSO's with 612 stations—it takes operating ability to do that!! And competition was high with 1302 operators represented in the scores; 923 in the U. S. and Canada, 379 in sixty foreign localities. It is estimated that amateurs were active in more than eighty countries.

To the victors go the spoils. In the case of this contest the winner in each A.R.R.L. Section and in each foreign locality receives a certificate attesting to his accomplishments. Every winner may feel justifiable pride upon a victory hard earned!

Deserving of special mention are the scores of several "highest scorers": X1AA 22,722; HC1LC 19,152; EA5BE 15,960; ZL4AI 13,650; ZL2CI 13,273; G5BY 12,051; EA4AH 11,544; ZL4AO 11,480; D4BAR and X1AM 11,349 (tied!); K4SA 11,124; CM2JM 10,403; CT1GU 10,296; F3MTA 10,140; ON4AU 10,127. Each of the following, in order of scores, had over 7000 points: EA1BC, K6IDK, VK3MR, K6HQO, K6BAZ, ZL2GQ, K6BFI, J2GX, VK3WL, ZS2A, F8EX, HP1A, F8EB, VK3KX, G2MA, ZL2GN.

Within the United States and Canada we find the following scores in addition to W3ZJ's record breaker: W1SZ 28,305; W4AJX 22,748; W1ZI 22,672; W2BHZ 20,081; W5CBY (operator "BZ") 19,920; W6QD 19,198; W2DC 19,194; W1FH 18,648; W8CRA 18,336; W9UM 16,080; W6CXW 15,072; W9ADN 14,490; W2UK 14,400; W2BYP 14,268; W9LJ 13,896. Highest Canadian scorer was VE2AX with 9036 points. Each of the following, in order of scores, made over 10,000: W1DHE, W9ARN, W2CQX, W9GDH, W6BYB, W6FZY, W1CMX, W1GSH, W8ZY, W8DVX, W4FT, W1BUX, W6EXQ, W1DJX, W6GRL, W8DLD.

Only six foreign participants worked all fourteen W/VE districts: NY1AB, X1AA, CM2JM, ZL4AI, ZL4AO and HC1LC. The following each worked thirteen districts: G5BY, D4BAR, ON4AU, F8EX, F8EB, X1AM, X1BC, X1CM, ZL2CI, ZL2GQ, ZL2GN, ZL4BT, K6COG, VK3MR.

Credit for working the greatest number of foreign localities goes to W1ZI who worked 52 countries! W1SZ would have equalled this record had that K7 been really in Alaska and not operating portable on the Pacific Coast!! W1SZ did, however, work 51 countries! W3ZJ was QSO 49 countries, W4CBY (two ops) 49, W8CRA 48, W2UK 45, W4AJX 44, W2BHZ 43, W1FH, W2DC 42, W2BYP 41, W2BSR, W9UM W3CGU (two ops) 40, W1GSH W1BUX W2CQX 39, W1CMX W2BXU 37, W1DJX VE2AX W8DLD W9IJ W9AEH 36. It is a recognized fact that West Coast amateurs cannot work as many different countries as eastern hams. In view of this fact it is a real accomplishment for W6CXW to have worked 32 countries, W7VY 30, W6QD 29, W7BB (two ops) 29, W6EXQ 28 and W6ADP 27!

It has been the practice in A.R.R.L. contests in recent years to make separate awards to the highest scoring amateur in each A.R.R.L. Section and each foreign locality. In this way operators are competing only with other amateurs within their own territories and conditions in different areas do not enter into the contest so much. However, it is always interesting to compare scores to see who made the highest score of all participants. In comparing highest United States scores this year an equalizing factor has been applied such as was suggested in February *QST* (page 23). The high ten scores in each of the four time zones were averaged to determine the correction factor for each zone. The averages were: Eastern 21,718, Central 11,606, Mountain 1,630, Pacific 11,264. The Eastern Zone having the highest average was used as a basis, with the following multiplication factors being found for the other zones: Central 1.83, Mountain 11, Pacific 2. The Mountain Zone factor is very high, due to the fact that the ten highest scores in that zone ran considerably lower than in the other areas. Applying these factors to compare the highest scorer in each time zone we have: (W6CNX (Mountain) 75,100; W6QD (Pacific) 38,400; W3ZJ (Eastern) 32,879; W9UM (Central) 29,400.

OUTSTANDING SIGNALS

Signals from the following foreign stations were reported as outstanding and consistent: In the First U. S. District—EA5BE (most outstanding),

VK3KX, ZL4AI, ZL4AO, ZS2A, FM8IH. Second U. S. District—ZS2A (most outstanding), EA5BE, ZL4AI. Third U. S. District—EA5BE (most outstanding), ZS2A, X1AA. Fourth U. S. District—ZL4AI (most outstanding), EA5BE. Fifth U. S. District—J2GX, ZS2A, ZL4AI, NY1AB. Sixth U. S. District—J2GX (most outstanding), ZL2CI, HC1LC, ZS2A, VK3WL, J2IN, LU2FC, ZT5R, F8EB, PA0LL, ZL4AO, VK5PK, KA1NA. Eighth U. S. District—ZL4AI (most outstanding), ZS2A, EA5BE, VK3KX, ON4AU, HC1LC, X1AA, F8EB. Ninth U. S. District—ZS2A (most outstanding), ZL4AI, HC1LC, EA5BE, ZL4AO, G5BY, X1AA, F8EB, LU1EP, J2GX, PY2BN, G2MA, VK4UU, KA1NA, ZL2CI, CM2OP, K4SA. Canada—VE4QX votes for J2GX, ZL2CI, VK3MR as most outstanding. VE5HQ picks CT1GU (14 mc.) as best. VE5GS submits following list, all consistent: HC1LC, KA1NA, J2GX, NY1AA, NY1AB, K6BFI, K6IDK, K6COG, K6AKP, K6JPD, K4SA, X1AM, ZL4AI, ZL4AO, VK3MR, VK3WL.

SCORES

(Operator of station first-listed in each Section and Country is winner for that territory, unless otherwise indicated. . . . Number countries-prefixes (in case of W/VE participants) and number W/VE Districts worked (in case of non-W/VE participants) shown in parentheses after call. . . . Asterisks denote stations not entered in contest, reporting to assure that stations they worked get credit.)

E. Mass.	W1FM (3)...	36	W1HQ (17)...	1241
W1ZI (52)...	22672 W1BWJ* (2)...	12	W1DCI (12)...	900
W1FH (42)...	18648 W1DAR* (2)...	10	W1CLH (18)...	864
W1CMX (37)...	11174 W1HJQ (1)...	6	W1DGC (15)...	855
W1GSH (39)...	11154 W1DOP (1)...	3	W1DBG (13)...	585
W1GMS (27)...	6669 W1FPX* (1)...	3	W1NI (12)...	576
W1ME (26)...	6318		W1DIO (11)...	528
W1IA (20)...	3340 Maine		W1CTO (8)...	448
W1FCU (21)...	2814 W1DHE (32)...	12864	W1EBO (9)...	378
W1RY (20)...	2620 W1BPX (29)...	8062	W1DBU (9)...	351
W1NW (17)...	2108 W1EF (22)...	4584	W1BHM (8)...	296
W1WZ (21)...	1953 W1TE (20)...	2640	W1CUX (8)...	240
W1AJA (17)...	1863 W1COV (11)...	561	W1AQS (8)...	232
W1FET (17)...	1768 W1CRP (6)...	198	W1BEQ (7)...	210
W1WV (14)...	1638 W1GKJ (7)...	189	W1AH (6)...	198
W1BJT (18)...	1404 W1DUJ (5)...	90	W1EBT (7)...	154
W1HJ (15)...	1395 W1FUO* (3)...	27	W1AGT (4)...	84
W1GF (18)...	1296 W1CDX (3)...	18	W1CNU (5)...	75
W1SB (15)...	1125 W1FAP* (1)...	3	W1DDX (4)...	72
W1GJQ (16)...	960		W1EAO* (2)...	12
W1GLF (14)...	924 Rhode Island			
W1BFK (11)...	814 W1BUX (39)...	10725	W. Mass.	
W1DQH (11)...	770 W1DJX (36)...	10692	W1CLX (31)...	7099
W1GDY (14)...	728 W1CAB (32)...	8256	W1CC (35)...	5810
W1BQN (11)...	627 W1HSA (16)...	1216	W1ZB (33)...	5643
W1AQT (10)...	570 W1BGA* (6)...	162	W1DLD (24)...	3864
W1GHQ (9)...	522 W1HQK (5)...	90	W1EK (16)...	1920
W1DSF (9)...	378 W1FOV (3)...	36	W1EBF (11)...	495
W1HTU (9)...	369		W1DA (7)...	273
W1AQF* (10)...	350 Connecticut		W1AFU (7)...	210
W1AGF (7)...	301 W1QV (34)...	8166		
W1BKL (9)...	252 W1SZ (51)...	28805	New Hampshire	
W1BFR (6)...	198 W1FT (35)...	8155	W1DUC (30)...	6330
W1CCA (7)...	189 W1CEG (35)...	7080	W1AVL (21)...	2751
W1DNL (5)...	165 W1DXL (24)...	4992	W1EPC (20)...	2360
W1BRB (7)...	147 W1GXC (24)...	2736	W1DMD (17)...	1598
W1HMK (5)...	105 W1DGG (19)...	2147	W1AQX* (7)...	147
W1FZH (4)...	72 W1YU (19)...	1653	W1EIO (4)...	60
W1CUF (4)...	48 W1WR (16)...	1328	W1BLA (3)...	27

Outstanding W stations heard in Australia: W3ZJ, W6QD, W3ZD, W3BBB, W4FT, W5AMO, W5UX, W5MS, W6GRL, W6CNX, W6CXW, W6CVZ, W7BB, W9BCX; in New Zealand: W2CIN, W3ZJ, W6BYB, W6CLP, W6GRL, W6QD, W7BB; in Czechoslovakia: W1QV R8, W4AJX W1ZI R7, W1SZ, W3ZD, W1LZ, W3ZJ, W2GOQ R6-7.

Vermont	W2ACV (6)...	180	W3CYN (4)...	60
W1BLR (5)...	150 W2UL (4)...	60	W3CXE (4)...	60
W1EZ* (4)...	48 W2CC (1)...	12	W3MG (4)...	60
	W2FCN* (1)...	3	W3DBX* (3)...	27
			W3CGN (1)...	3
N. Y. C.-L. I.			W3DRH (1)...	3
W2BHZ (43)...	20081 No. New Jersey		W3BDS* (1)...	3
W2UK (45)...	14400 W2CQX (39)...	12831	W3BNK* (1)...	3
W2YSR (40)...	8630 W2DPB (34)...	9690	W3EAN* (1)...	3
W2CIN (22)...	5874 W3CGU (40)...	13520		
W2ETM (29)...	5357 W2BXU (37)...	7844		
W2AHC (25)...	4425 W2CZ (22)...	6264	Virginia	
W2BJ (21)...	3360 W2AIW (31)...	5859	W3CHE (28)...	6580
W2CJM (24)...	3312 W2FHI (29)...	5307	W3BWA (28)...	4612
W2BEF (22)...	3300 W2GW (27)...	4455	W3CCU (19)...	2820
W2AIS (20)...	2660 W2DZA (25)...	3550	W3BEK (18)...	1620
W2UQU (18)...	2142 W3COP (31)...	5053	W3AG (20)...	1320
W2ERI (16)...	2096 W2EKM (20)...	2260	W3BAI (12)...	767
W2EMJ (19)...	1976 W2BLV (17)...	1802	W3ADD (9)...	513
W2ECU (20)...	1860 W2EOH (18)...	1398	W3AAJ (6)...	132
W2DZJ (16)...	1776 W2SE (15)...	1305	W3EAP (4)...	44
W2ALB (16)...	1568 W2ATF (14)...	1120	W3BAD (4)...	32
W2FU (17)...	1554 W2DFN (14)...	1008	W3UVA (3)...	27
W2DRJ (15)...	1350 W2DEW (14)...	756	W3BIW (3)...	27
W2BEM (17)...	1325 W2GIZ (10)...	650	W3DSH (1)...	3
W2DSC (15)...	1320 W2AGX (10)...	500	W3DCU* (1)...	3
W2DYO (16)...	1216 W2BYK (12)...	450		
W2CTO (17)...	1207 W2BSQ (7)...	378	No. New Jersey	
W2CGB (14)...	1008 W3FO (7)...	324	W3NK (28)...	4956
W2EXO (10)...	870 W2AMR (9)...	324	W3AIU (29)...	4524
W2CMT (12)...	720 W2CLM (8)...	288	W3ARN (21)...	2604
W2ARY (9)...	567 W2BFC (8)...	264	W3WV (17)...	2449
W2EJZ (10)...	550 W2ABC (8)...	216	W3CAD (12)...	816
W2CJQ (11)...	484 W2CJX* (7)...	189	W3DAU (10)...	700
W2DJM (8)...	480 W2AUQ (6)...	162	W3CBR (10)...	682
W2BHD (11)...	429 W2FL (6)...	144	W3EDP (13)...	546
W2FAB (9)...	405 W2CDA (5)...	135	W3AKU (13)...	507
W2EXM* (11)...	396 W2ELP (5)...	105	W3DOK (10)...	440
W2DLO (9)...	395 W2CAY (5)...	75	W3ECO (10)...	280
W2ELE (9)...	351 W2EJB* (5)...	75	W3BIR (6)...	204
W2WTV* (8)...	312 W2GVZ (5)...	75	W3DSY (7)...	196
W2DEH (7)...	189 W2ABS (4)...	72	W3DLZ (5)...	120
W2AEN (5)...	180 W2CGJ (3)...	54	W3ACX (5)...	90
W2EIL (7)...	168 W2CAD (4)...	48	W3ZX* (3)...	36
W2BWL (6)...	126 W2FOP (3)...	27	W3BVE (3)...	27
W2FIS (5)...	120 W2SN* (3)...	27	W3AOC (1)...	3
W2ERC (6)...	108 W2DLF (2)...	12	W3AXU (1)...	3
W2KU (5)...	75 W2EDJ (2)...	8		
W2CAC (4)...	48		Id.-Del. D. C.	
W2BXW (4)...	48 E. Penna.		W3APJ (28)...	4500
W2AFA* (3)...	27 W3ZJ (49)...	32879	W3HC (17)...	1904
W2EQG (3)...	27 W3AOJ (31)...	8308	W3ADP (17)...	1479
W2DTL (3)...	27 W3BET (31)...	5084	W3BZB (15)...	1125
W2DGO (2)...	12 W3ANS (27)...	4752	W3CIC (8)...	656
W2FLG* (2)...	12 W3BES (22)...	4246	W3EHW (9)...	540
W2AOC (1)...	6 W3BRU (25)...	3825	W3BYN (10)...	450
W2FNI (1)...	3 W3JM (20)...	1960	W3IG* (10)...	310
			W3BBB (19)...	1881
			W3BYT (16)...	1152
E. New York			W3BEN (6)...	162
W2DC (42)...	19194 W3QM (12)...	756	W3AWS (6)...	126
W2BYP (41)...	14268 W3BQU (12)...	694	W3EIV (4)...	96
W2CBO (24)...	4800 W3ANZ (9)...	513	W3CBV (4)...	84
W2BEW (2)...	3912 W3BPY (10)...	430	W3BYO (4)...	50
W2EMV (15)...	1635 W3BLG (10)...	320	W3VJ (3)...	51
W2OA (16)...	1616 W3CPV (8)...	264	W3PN* (3)...	36
W2ETH (17)...	1377 W3BBN (8)...	240	W3ZE (3)...	36
W2SZ (15)...	1290 W3EE* (8)...	232	W3BJV (2)...	18
W2AQN (11)...	451 W3EJO* (8)...	200	W3BEZ (2)...	18
W2BMX (12)...	444 W3ALB (7)...	154		
W2CFU (10)...	420 W3CCT (7)...	119	E. Florida	
W2OGO (7)...	210 W3CWU (6)...	108	W4AJX (44)...	22748
W2DTB* (7)...	189 W3KT (4)...	72	W4TZ (35)...	9730

1 Although W1SZ made a higher score than W1QV, the Conn. award goes to W1QV, since A.R.E.L. HQ members and stations are not eligible for awards. 2 Stn. Score. Opr. "KAB" 734. "HMM" 48. 3 Stn. Score. Opr. "FEM" 390. "YI" 300. "HD" 3. "SS" 12. "JAK" 2. "EMW" 12. 4 Stn. Score. Opr. 3CGU 8896, 3EHN 1700. 5 Stn. Score. Opr. 3COP 2574, 2CPU 630. 6 Portable in Third District. 7 Portable in Fourth District. 8 Stn. Score. Opr. "BZ" 19920. "DE" 1089. 9 Stn. Score. Opr. 4GDG 5150, 4BWP 3. 10 Certain details bearing on the certificate award in this Section and requiring further study make it impossible to announce the winner at this time. 11 Stn. Score. Opr. "KO" 8129. "ERS" 3268. 12 Stn. Score. Opr. "HK" 315. "RM" 238. 13 Stn. Score. Opr. "HK" 36. "NK" 24. 14 Stn. Score. Two ops. 15 George Meek, W3IB, operator. 16 Stn. Score. Opr. "EB" 95. "WB" 43. 17 Stn. Score. Opr. 8DY 108, 8PMX 3. 18 Stn. Score. Opr. "Art" 540. "LH" 120. 19 Stn. Score. Opr. "CEB" 12. "CEB" 9. 20 Stn. Score. Opr. "D.M.D." 4081. "D.F.O.D." 2540. 21 Stn. Score. Three ops. 22 Stn. Score. Two ops. 23 Stn. Score. Opr. "CLG" 350. "SAB" 189. "TGH" 18.

CLUB PARTICIPATION

Special certificate awards were offered to the highest scoring participant in each A.R.R.L.-affiliated club where three or more individual club members took part and submitted scores.

Awards are being made to the highest scorer in 21 clubs. The winners and their clubs are as follows: W1QV, Amateur Radio Research Club, New London, Conn.; W1DUK, Great Bay Radio Association, East Rochester, N. H.; W1WZ, Fellsway Radio Club, Medford, Mass.; W3CGU,

W4NN* (34)...	7498	W5CET (4)...	116	W6DYF (5)...	120	Washington ¹⁰	W8BTI (34)...	8738	W. New York
W4BGP (17)...	1785	W5BNI (5)...	85	W6DVE (1)...	3	W7VY (30)...	9600	W8ANQ (32)...	5728
W4CJ (16)...	1740	W5DNI (4)...	60			W7DFC (25)...	8750	W8BLP (21)...	3087
W4WAG (13)...	828	W5DND (3)...	00	San Diego		W7DPI (29)...	11397 ¹¹	W8ANT (19)...	3648
W4AIO (13)...	689	W5DSI (2)...	18	W6HEX (22)...	6930	W7DI (25)...	8500	W8KSC (27)...	2282
W4CRK* (12)...	585	W5BKN* (2)...	12	W6BAM (17)...	2567	W7ABL (19)...	8750	W8JTP (24)...	1988
W4ABV (9)...	342	W5BQU* (1)...	6	W6GTM (11)...	1595	W7X (14)...	8372	W8DGP (18)...	1767
W4AWY (7)...	231	W5CLZ (1)...	3	W6AKY (10)...	310	W7P (14)...	8372	W8ANO (22)...	1606
W1HCX (3)...	637			W6GSI (12)...	624	W7BGH (10)...	720	W8CBC (17)...	1275
W4APY (2)...	34	Okahoma		W6GSI (7)...	324	W7WZ* (7)...	406	W8CFT (16)...	1264
		W5BOW (22)...	5082	W6GHI (7)...	324	W7RL (6)...	342	W8BOS (16)...	1056
Ga.-S.C.		W5AFX (19)...	3382	W6GEE (3)...	63	W7BBY (6)...	216	W8BUM (15)...	965
W4CBBY (49)...	26264*	W5BFF (20)...	2920	W6JQB (3)...	63	W7CAB (4)...	156	W8EHO (15)...	825
W4BRY (18)...	1768	W5CAI (11)...	660	W6KBX (3)...	36	W7LD (3)...	72 ¹²	W8ARO (12)...	780
W4BBP (18)...	1530	W5CPI (19)...	513			W7ALZ* (3)...	36	W8AUP (15)...	765
W4BRG (10)...	600	W5CXU (4)...	176	Utah-Wyoming		W7F (3)...	27	W8KY (12)...	672
W4CPZ (11)...	550	W5BSK (5)...	165	W6CNY (26)...	6812	W7AYM (2)...	24	W8PLF (13)...	663
W4CQ* (1)...	4	W5ARB (6)...	144	W7EDC (1)...	6	W7CCT* (1)...	3	W8LBG (12)...	576
				W7COH (1)...	3			W8VZ (10)...	540
No. Carolina		Arkansas		East Bay		Oregon		W8ENA (12)...	492
W4FT (32)...	10848	W5ASG (22)...	2904	W6EYC (23)...	6325	W7BD (21)...	4473	W8NP (11)...	473
W4WE (25)...	5225*	W5ZF (16)...	2400	W6EMU (22)...	5786	W7FH (15)...	1395	W8DJJ (11)...	462
W4MR (28)...	4732	W5BXN (13)...	1183	W6EMU (22)...	5786	W7AMX (8)...	1032	W8DXD (10)...	380
W4ATS (24)...	3192	W5AQD (4)...	48	W6T (18)...	4574	W7AVV (8)...	504	W8FTV (9)...	270
W4BKS (15)...	1215			W6BB (18)...	4574	W7AXO (9)...	459	W8FTV (9)...	270
W4TP (15)...	855	Louisiana		W6FMY (9)...	1053	W7BMA (7)...	322	W8QO (8)...	216
W4OG (13)...	793	W5CUI (15)...	1575	W6FDI (10)...	750	W7AIN (7)...	238	W8BXC (7)...	189
W4TS (12)...	612	W5DAW (7)...	280	W6AHI (10)...	750	W7BPJ (7)...	231	W8GNN (8)...	184
W4DW (8)...	600	W5AOZ (3)...	24	W6FWO (7)...	616	W7UJ (5)...	200	W8FEQ (7)...	168
W4AMC (11)...	462			W6GJA (5)...	240	W7BUB (9)...	186	W8CBF (4)...	132
W4ZH (10)...	420	New Mexico		W6AUI (6)...	216	W7DAA (4)...	92	W8FPL (6)...	108
W4CEN (10)...	360	W5AAK (8)...	384	W6AUT (6)...	216	W7AMP* (4)...	84	W8CBI (6)...	75
W4RA (7)...	273			San Joaquin Val.		W7CQO (4)...	84	W8ENW (4)...	48
W4ATY (3)...	72	Mississippi		W6CLP (21)...	6300	W7APG (4)...	48	W8KWJ (3)...	27
W4B (3)...	39	W5BUI (3)...	36	W6CCK (19)...	3914	W7BOH (4)...	48	W8BYM (3)...	12
W4BUE (3)...	36			W6CXI (20)...	3360	W7L (2)...	42	W8LEA (2)...	27
W4CTO (2)...	1	Los Angeles		W6ASV (13)...	2093	W7BNK (3)...	36	W8FGC (1)...	3
		W6QJ (29)...	19198	W6ECU (10)...	1120	W7DWQ (1)...	3	W8BMK (1)...	3
Tennessee		W6CWX (22)...	15072	W6CYY (8)...	528	Idaho		W8CER (1)...	3
W4SW (19)...	2831	W6EZY (25)...	11175	W6EFS (6)...	330	W7BYW (17)...	3366	W8CZR (1)...	3
W4EM (7)...	525	W6EXQ (28)...	10966	W6EFP (4)...	88	W7CHT (7)...	357	W8SPD (1)...	3
W4ZP (8)...	513	W6GRL (26)...	10553	W6BNH (4)...	88	W7BLT* (8)...	240	Michigan	
W4VT (8)...	376	W6ADP (27)...	7938	W6BFF (3)...	66	W7A00 (5)...	135	W8A50 (31)...	6324
W4FX* (1)...	3	W6ENV (26)...	7930	W6JAB (3)...	36	W7ACD (4)...	88	W8DED (26)...	4394
		W6AHP (25)...	6650	W6EPQ (1)...	3	W7BRU (1)...	3	W8DOI (30)...	3290
		W6CVZ (23)...	6486					W8EPC (26)...	3302
W. Florida		W6GRX (24)...	6384					W8WBW (23)...	2576
W4BSJ (20)...	1960	W6BEC (22)...	5654	W6SCL (23)...	5474	Montana		W8CPH (24)...	2448
W4BGS (15)...	1200	W6AM (19)...	4275	W6FQY (17)...	4131	W7BVI (5)...	365	W8GRN (22)...	2134
W4MS (7)...	453	W6FEX (17)...	2584	W6AOD (20)...	4060			W8INY (19)...	2052
W4AUW (9)...	252	W6TF (16)...	2544	W6DCP (9)...	513	W. Penna		W8DYK (20)...	1480
		W6TJ (17)...	2193	W6CZU (6)...	180	W8CRA (48)...	18336	W8CU (14)...	1050
Alabama		W6CEM (14)...	1554	W6BOP (4)...	48	W8CTE (31)...	5766	W8CHJ (11)...	704
W4BTU (6)...	162	W6BXL (15)...	1440	W6OI* (3)...	45	W8DWV (31)...	5735	W8BTK (12)...	660
W4DS (3)...	45	W6ANL (10)...	1410	W6DNY (1)...	3	W8ALO (24)...	3936	W8GSZ (12)...	540
W4APU (2)...	14	W6DIO (15)...	1305	W6GOZ* (1)...	3	W8HWE (23)...	3887	W8HUD (10)...	460
		W6GH (11)...	1221	W6AMM*10...		W8DON (27)...	3276	W8ESH (9)...	324
		W6WQ (10)...	1010			W8AAT (21)...	3234	W8SS (8)...	298
No. Texas		W6BYU* (9)...	855			W8BFE (21)...	2079	W8SHW (7)...	210
W5ATF (25)...	6075	W6PZL (9)...	702	San Francisco		W8BOE (20)...	2060	W8ND (6)...	208
W5AVG (24)...	5064	W6ASD (9)...	513	W6ZS (24)...	5112	W8FTM (15)...	720	W8LEC (6)...	180
W5AMO (22)...	4026	W6CVY (7)...	469	W6TIS (19)...	2954	W8GUF (11)...	459	W8CYW (7)...	147
W5AQI (18)...	2700	W6HJW (8)...	408	W6GCS (14)...	2155	W8KWA (8)...	312	W9IOW (6)...	126
W5BLI (5)...	845	W6JAL (7)...	273	W6AGS (5)...	270	W8GMH (10)...	309	W8QGB (5)...	105
W5BRY (6)...	135	W6L (5)...	205	W6KRX (8)...	216	W8WMY (8)...	158	W8W (3)...	63
W5BVR (4)...	32	W6HLL (6)...	198	W6ANL (5)...	210	W8AXD* (8)...	176	W8AKK (4)...	60
W5BRS* (2)...	24	W6HFT (4)...	108	W6GWW (4)...	198	W8FAD (6)...	126	W8KLE (2)...	10
W5CVC (2)...	12	W6HFO (4)...	108	W6GWL (4)...	120	W8HWD (5)...	108	W8FV* (2)...	12
W5CPT (1)...	3	W6FET (5)...	105	W6WCH (4)...	95	W8HDT (4)...	43	W9ANT (1)...	3
W5AVA* (1)...	3	W6JX* (4)...	96	W6FPU (5)...	95	W8EY (3)...	42	W8EGF* (1)...	3
W5CPB* (1)...	3	W6KPA* (4)...	84	W6WAL (5)...	95	W8R (3)...	28	W. Virginia	
		W6EWC (3)...	81	W6WNB (3)...	72	W8SVI (3)...	17	W8AZD (29)...	6032
So. Texas		W6AAK (4)...	60	W6IBQ (2)...	30	W8AYQ (2)...	12	W8HGA (24)...	3258
W5UX (25)...	5975	W6POQ (3)...	45	W6BVL (2)...	8			W8JRL (15)...	2115*
W5MS (21)...	5586	W6DVT (3)...	36	W6GPB (1)...	6	Ohio		W8CDV (10)...	370
W5AFV (19)...	2660	W6IDW (2)...	36			W8Z (33)...	11121	W8BDP* (3)...	45
W5AUC (13)...	1573	W6IDW (2)...	36			W8DYL (36)...	11060	W8JM* (1)...	3
W5CT (11)...	913	W6HMW (3)...	21	Arizona		W8Z (33)...	11121	W8JYD (10)...	440
W5BBR (11)...	847	W6IWS (2)...	18	W6DRE (11)...	1089	W8DYX (3)...	11060	W8JYD (10)...	440
W5LP* (13)...	741	W6BQO* (1)...	3	W6DHR (10)...	660	W8DLX (3)...	11060	W8JYD (10)...	440
W5ADZ (11)...	627			W6FGG (7)...	371	W8H (3)...	17	W8JYD (10)...	440
W5DMB (9)...	441	Sacramento Val.		W6IQY (7)...	252	W8H (3)...	17	W8JYD (10)...	440
W5ARO (8)...	240	W6BYB (26)...	11258	W6QFE (8)...	208	W8H (3)...	17	W8JYD (10)...	440
W5PF (6)...	228	W6ETM (11)...	1001	W6CFB (2)...	12	W8H (3)...	17	W8JYD (10)...	440

Tri-County Radio Association, Rahway, N. J.; W2DC, Schenectady Amateur Radio Association; W2EKM, West Essex Radio Club, Verona, N. J.; W2DHH, Williamsburg Radio Club, Brooklyn, N. Y.; W3CHE, Tidewater Amateur Radio Association, Norfolk, Va.; W3ARN, Delaware Valley Radio Association, Trenton, N. J.; W4CBY (opr. BZ), Atlanta (Ga.) Radio Club;

W5ADZ, Houston (Texas) Amateur Radio Club; W6HEX, Southeast Radio Experimental Association, Bell, Calif.; W8ANQ, Rochester (N. Y.) Amateur Radio Association; W8DWV, Beaver Valley Amateur Radio Club, Rochester, Pa.; W8CBI (Dayton, Ohio) Amateur Radio Association, Inc.; W8KYY, Massillon (Ohio) Amateur

(Continued on page 44)

W9ICO (12)...	384	W9JGF (13)...	1976	VE2DR (11)...	814	AFRICA	D4BMJ (12)...	3744	LA2U (1)...	3
W9GCP (7)...	294	W9MKN (7)...	231	VE2AW (14)...	672	U. of So. Afr.—ZS/	D4BIU (8)...	3152	LA1X* (1)...	3
W9AFB (9)...	261	W9DQD (4)...	72	VE2EW (12)...	504	ZT/ZU	D4UAO (7)...	2212		
W9TH (7)...	252	W9FYG* (2)...	12	VE2HG (10)...	390	ZS2A (11)...	D4BBK (9)...	2070	Switzerland—HB	
W9AZP (7)...	232	W9GBQ* (2)...	12			ZU1E (9)...	D4BKU (5)...	1557	HB3J (8)...	2632
W9EAY (7)...	232			Ontario		ZU1H (10)...	D4BBN (8)...	840	HB9AO (7)...	588
W9FQF (7)...	231	Iowa		VE3GH (31)...	5456	ZS2F (8)...	D4BBN (8)...	840	HB9AG (3)...	135
W9IML (8)...	234	W9AZZ (29)...	3480	VE3WA (26)...	3718	ZT5R (4)...	D4BNN (8)...	840	Czechoslovakia—OK	
W9KEH (7)...	189	W9FDL (14)...	910	VE3JZ (19)...	1882	ZT1R (6)...	D4CAF (8)...	632	OK1AW (9)...	2403
W9LOJ (7)...	144	W9ABE (11)...	462	VE3HF (20)...	1780	ZT1H (5)...	D4BQO (5)...	555	OK1BC (7)...	735
W9ISM (6)...	144	W9HQA (5)...	105	VE3SI (14)...	1624	ZT5V (3)...	D4CFE (4)...	264	OK2OP (8)...	664
W9JO (6)...	138	W9CWG (4)...	48	VE3DD (14)...	1120	ZS6AF (3)...	D4CBT (5)...	210	OK2MA (5)...	280
W9GGS (6)...	126	W9MJC (2)...	24	VE3QD (13)...	702	ZSIC (2)...	D4BUT (6)...	185	OK1AZ (3)...	48
W9GSS (6)...	126	W9DIB (2)...	22	VE3WB (9)...	270	ZS1B (1)...	D4BCF (4)...	160	OK2CM (3)...	33
W9LAR (5)...	120	W9HCH* (2)...	12	VE3XC (6)...	126	ZU6P* (2)...	D4BLU (4)...	128		
W9LZQ (5)...	105	Missouri		VE3WV (7)...	119	ZT6N (2)...	D4BBL (4)...	116	Netherlands—PA	
W9SG (4)...	96	W9ASV (18)...	2844	VE3IG (4)...	104	Algeria—FM8	D4BNU (4)...	92	PA0XG (8)...	2184
W9LJC (4)...	46	W9GBJ (17)...	1632	VE3LJ (4)...	56	FM8IH (10)...	D4BDH (4)...	80	PA0FX (9)...	2124
W9VT (3)...	36	W9FUM (16)...	1392	VE3OO* (2)...	12	3	D4BEN (5)...	75	PA0DC (9)...	1872
W9OVI (3)...	36	W9HUZ (12)...	696	VE3AM* (1)...	3		D4BAU (4)...	68	PA0QQ (9)...	1656
W9SI (3)...	27	W9EDK (13)...	624	Alberta		Madagascar—CT3	D4BGN (3)...	45	PA0XF (10)...	1340
W9AA (3)...	27	W9GUN (6)...	366	VE4EA (7)...	602	CT3AB (10)...	D4BAI (3)...	26	PA0AP (8)...	1016
W9KQW (3)...	27	W9HVV (5)...	315	VE4GD (3)...	81	CT3AN (4)...	D4BLO (3)...	27	PA0LL (7)...	875
W9EJC (3)...	27	W9LXO (7)...	217	VE4QX (2)...	18	CT3AD (3)...	D4BOM (2)...	18	PA0RP (6)...	648
W9PSP (3)...	12	W9FFR (5)...	165	VE4XK (2)...	2	Canary Islands—EA8	D4BJF (2)...	12	PA0KK (5)...	210
W9KE (2)...	12	W9HON (6)...	144	VE4PH* (1)...	2	EA8GCC (7)...	D4BRM (2)...	12	PA0CO (5)...	195
W9LJX (2)...	12	W9GTU (5)...	75	Manitoba		EA8AH (5)...	D4BFU (1)...	6	PA0PF (6)...	186
W9BEP (2)...	12	W9KEI (5)...	65	VE4DU (10)...	480	Egypt—SU	D4BLJ (1)...	6	PA0ZM (4)...	96
W9LEP (1)...	6	W9LDF (3)...	36	VE4LH (2)...	30	SU1EC (6)...	D4BBI (1)...	5	PA0CH (4)...	80
W9LL (1)...	6	W9LBB (3)...	21	VE4DK (2)...	30*	Kenya—VQ4	D4BBU (1)...	3	PA0FB* (3)...	27
W9NPW (1)...	3	W9PTV (2)...	8			VQ4CRO (6)...	D4BMT (1)...	3	PA0ASD (2)...	12
W9IU (1)...	3	W9KVN (1)...	4	Saskatchewan			D4BNK (1)...	3	PA0AZ (1)...	6
W9PVH (1)...	3	W9ENU (1)...	3	VE4JV (3)...	45	EUROPE	D4BUK (1)...	3	PA0HAN (1)...	3
W9FG* (1)...	3			VE4IG (3)...	27	Spain—EA			North Ireland—GI	
Kansas		So. Minn.		VE4AT (1)...	6	EA5BE (10)...	Portugal—CT1		GI5QX (9)...	1952
W9GDH (34)...	12716	W9DMA (17)...	1071	VE4KA (1)...	3	EA4AH (12)...	CT1GU (11)...	10296	GI5UR (4)...	96
W9JBY (17)...	1955	W9LJD (12)...	984	VE4CV (1)...	3	EA4BC (12)...	CT1BY (9)...	2682		
W9BEZ (17)...	1904	W9BTW (10)...	540			EA1BH (12)...	CT1AA (7)...	1904	Azores—CT3	
W9DFY (15)...	1485	W9BHZ (12)...	528	Brit. Columbia		EA1AM (8)...	CT1EL (4)...	120	CT2AW (9)...	1791
W9NMR (7)...	33	W9FNN (11)...	484	VE5BI (9)...	1458	EA4AV (7)...	Belgium—ON		Italy—I	
W9IPD (3)...	42	W9FDU (7)...	168	VE5HQ (11)...	1276	EA1BB (6)...	ON4AU (13)...	10127	IT1KM (8)...	1368
		W9CYA (5)...	105	VE5EH (9)...	945	EA5BD (3)...	ON4FE (9)...	3438	XI1ER (4)...	72
		W9DGH (4)...	76	VE5FG (7)...	455		ON4MT (4)...	2120	Finland—OH	
Kentucky		W9EYL (2)...	12	VE5FE (5)...	304	Great Britain—G	ON4ZQ* (2)...	12	OH5OD (7)...	903
W9ELL (30)...	9330	No. Minn.		VE5LD (5)...	135	G5BY (13)...			OH3NP (7)...	203
W9BPB* (9)...	333	W9BMX (13)...	585	VE5L* (3)...	45	G2MA (12)...	France—F			
W9BWJ (7)...	252	W9HDN (10)...	380	VE5GS (3)...	45	G2NH (11)...	FREX (13)...	7839	Saar—EZ	
W9PLM (5)...	225	W9LJV (3)...	27	VE5EZ (2)...	30	G6RB (10)...	F8EB (13)...	7618	EZ4SAX (7)...	721
W9CIS (3)...	36	W9NIM (2)...	12	ASIA		G2ZQ (12)...	F8WB (11)...	4510		
W9AUH (2)...	12	W9HNS (1)...	3	Japan—J		G5LA (9)...	F8RJ (12)...	2580	Hungary—HAF	
Wisconsin		Nebraska		J2GX (11)...	8162	G2EM (9)...	F8TQ (9)...	2187	HAF1G (6)...	678
W9TH (28)...	4816	W9HZR (6)...	174	J2HI (7)...	2464	G6RV (8)...	F8RQ (9)...	1629	HAF3D (5)...	535
W9ARE (23)...	2461	W9DFR (4)...	72	J2GY (7)...	2163	G6NJ (10)...	F3AR (7)...	1120	HAF4H (8)...	448
W9OT (21)...	2037	W9DMY (3)...	45	J2GW (6)...	1296	G6GS (9)...	F8JG (5)...	620	HAF8D (6)...	444
W9MT (20)...	2000	W9DGL (1)...	3	J2CE (5)...	1080	G5JU (9)...	F8J (9)...	584	HAF3H (7)...	371
W9CCI (15)...	1340	W9BBS (1)...	3	J2HE (4)...	954	G6WY (8)...	F8ZF (5)...	405	HAF2F (5)...	245
W9BTB (19)...	1235	No. Dakota		J3DP (4)...	712	G6XN (9)...	F8Q (6)...	336	HAF8C (2)...	24
W9GIL (15)...	1110	W9EMY (4)...	72	J3DH (4)...	600	G6LK (11)...	F8LX (5)...	330	HAF7A (2)...	22
W9FJQ (12)...	980	W9EIG (1)...	6	J3DU (5)...	525	G2IO (11)...	F8VT (4)...	224	HAF5C (1)...	6
W9GFH (14)...	630	So. Dakota		J3JJ (5)...	520	G2OA (8)...	F8S (5)...	160	Lithuania—LY	
W9PAV (7)...	357	W9IQZ (1)...	3	J3CB (5)...	480	G6WY (9)...	F8V (7)...	158	LY1J (7)...	539
W9FAW (8)...	336			J3HZ (3)...	432	G6QB* (9)...	F8WU (4)...	96	Poland—SP	
W9GCH (9)...	324	Maritime		J3C (2)...	180	G2AK (7)...	F8T (4)...	60	SPI1DE (6)...	468
W9BQM (7)...	259	VE1DQ (20)...	2920	J3CG (2)...	150	G5SR (7)...	F8UQ (5)...	35	SPIAR (4)...	228
W9CCG (7)...	134	VE1EA (17)...	2890	J3CJ (2)...	108	G6BD (8)...		80	SPI1A (3)...	36
W9HJ (4)...	70	VE1DR (16)...	1920	J3LX (2)...	51	G6CL (7)...	Irish Free State—EI		SPI1B (2)...	12
W9ELQ (4)...	62	VE1EP (17)...	1717	J3EM (1)...	48	G6GZ (5)...	E18B (11)...	68750	SPI1C (2)...	10
W9GVL (3)...	54	VE1DO (8)...	264	J3HK (2)...	27	G5QY (7)...	E15F (8)...	1072	Danish—YM	
W9BDO (2)...	27	VE1DE (3)...	63	J3JI (1)...	6	G6TT (4)...	E18D (4)...	156	YM4ZO (6)...	258
W9JLF (1)...	12	VE1EX (3)...	63	Hong Kong—VS		G2UX (3)...	E14D (1)...	3		
W9GVF (1)...	3	VE1AE* (2)...	12	VS8AG (3)...	513	G2RF (2)...				
W9FTH (1)...	3			VS8AE (2)...	204	G5DS (2)...				
W9FU* (1)...	3	Quebec				G5GQ* (2)...				
Colorado		YE2AX (36)...	9036	Burma—VU		Germany—D			Austria—OE	
W9FYY (18)...	4320	VE2EE (24)...	2976	VU2LZ (1)...	6	D4BAR (13)...	LA1R (9)...	3375	OE1ER (4)...	156
						D4BDR (12)...	LA1V (7)...	259	(Cont'd on page 44)	

The Convention Season Progresses

Large Attendances and High Enthusiasm Characterize This Year's Gatherings

The Atlantic Division Convention

THE Hotel Schenley at Pittsburgh, June 22d and 23d, was a regular beehive of hams representing every section of the division. From the time that "Bill" Martin, W8CNZ, chairman of the convention, called the delegates to order until the award of the last prize, there was not an idle moment. The preparation of this affair, under the auspices of the Amateur Transmitters' Association, South Hills Brasspounders, Beaver Valley Amateur Radio Club and the Amateur Communications Club, gave evidence, as the program progressed, of careful planning by the committee presided over by A. P. Sunnergren, W8FTY.

Director Woodruff, W8CMP, started the program with a lecture on "Radio Building Blocks" clearly demonstrating how to avoid spending a fortune on the building of a transmitter or other units. Following this, H. L. Buechner of Westinghouse, covered the subject of miniature radio instruments fully and H. V. Noble of the Gulf Research Labs delivered a splendid talk on "Short-Wave Superhet Designs." Other fine lectures were given by R. S. Kruse and John L. Reinartz. Clark C. Rodimon, W1SZ, and A. A. Hebert, treasurer, represented A.R.R.L. The convention was honored by having present Chas. H. Stewart, Vice-President A.R.R.L., who spoke on legislative matters in Washington. During the convention two meetings of the 'phone and traffic groups were held, with Dr. Simpson, W8CPC, and SCM C. H. Grossarth, W8CUG, respectively, in charge. In the traffic meeting W3BYS represented Eastern Pennsylvania and W8GPS, Western New York. W8HD, Hoffman, SCM for West Virginia, assisted as a visitor. Outstanding events of the convention were demonstrations by Dr. Phillips Thomas of Westinghouse and Dr. J. O. Perrine of Bell Laboratories. Motion pictures of the Board of Directors were shown for the first time and Mr. Fabian, W8GJM (through whose courtesy the motion picture projector was obtained) was later responsible for some fine entertainment at the banquet. The efforts of W8BIT, in charge of the prizes, enabled practically every delegate to receive a remembrance.

More than 400 people attended the banquet. Under the guiding hand of Toastmaster Dr. Simpson, the guests, speakers and professional entertainers enjoyed a high degree of conviviality. The climax of the evening was the choice of the next convention city, which, after a spirited contest, went to the Syracuse delegation.

—A. A. H.

The Indiana State A.R.R.L. Convention— South Bend, Ind.

AT the Oliver Hotel, South Bend, the registration desk opened to a waiting line at 9 a.m. Friday, June 8th.

The convention itself opened with a bang at 2 p.m. with a trip through the "Silver Edge" Brewery, with plenty of free refreshment for all. This was followed with trips through the local A. T. & T. repeater station; The Indiana & Michigan Electric Company's power house at Twin Branch, and WPGN, the South Bend Police radio station. The evening was given over to the visiting of local ham shacks. Cars and guides were furnished by local members of the club.

On Saturday morning the Sectional Meetings were held. Cummings, W9FQ, of Valparaiso gave a traffic talk; Crawford, W9CBN, of South Bend, a talk on the N.C.R.; and Bartlett, W9JHY, of Indianapolis conducted a talk and general discussion on the subject of 'phone. After the crowd had assembled in the auditorium after lunch, F. H. Schnell gave a talk on r.f. amplifier efficiency, and a demonstration concerning automatic transmission, code speed, and the proper adjustment of a bug key. Boyd Phelps next gave plenty of good dope on antennas. Following this Professor Johnson (we think that was an alias) set up an elaborate apparatus and gave a demonstration and lecture on improving the output of tubes by coating their envelopes with some chemical, the formula for which was two feet long. Unfortunately an accident resulted in an explosion, ruining his demonstration. After the smoke cleared away, the tube was found to be well coated. Most of those present were not inclined to take this seriously, and some bolder ones even laughed out loud! A short discussion of League policies and happenings at the recent Board meeting was lead by Director Windom of Columbus, Ohio and Rex Munger, W9LIP, of Minneapolis-St. Paul.

The gang assembled during the early evening for the banquet, at which excellent entertainment was furnished in the form of music and songs. After the banquet J. L. Reinartz, W1QP, presented the tales of his trip North.

Sunday morning started off with a talk by F. H. Schnell on antenna measurement and efficiency. This was followed by another talk by Reinartz on antenna mastering; the use of the oscilloscope, demonstrating modulation from zero to over 100% and a new one-tube 5-meter circuit.

The convention ended at noon with the awarding of a large number of fine prizes. Those who remained for the afternoon attended an air circus at the municipal airport. Amateurs from Illinois, Minnesota, Ohio, Michigan, as well as Indiana were present at the convention, but the real DX record goes to Mr. and Mrs. Frank Lihbe, W5BBR, of McAllen, Texas, who registered Friday noon after several days of driving.

Credit for the success of the convention goes to the St. Joseph Valley Amateur Radio Club, which sponsored the convention, the South Bend Chamber of Commerce, the Oliver Hotel, and the various manufacturers who coöperated.

—C. R. Putnam, W9AKJ, Secy.
S.J.V.A.R.C.

South Dakota's Convention

THE convention this year at Huron, South Dakota, run under the auspices of the Huron Radio Club, proved a characteristic success. Talks were given by Max Stacey of KSOO, Sioux Falls; Elmer Bayles, W9BAE; Eddie Smith and Rex Munger. Side trips to various points of interest proved a great attraction but the highlight of the whole affair was undoubtedly a 56-mc. demonstration of communication between plane and ground. In spite of very unfavorable flying weather (a bad dust storm in the morning) W9CFU, piloting the plane, maintained completely satisfactory two-way contact with a pair of ground stations. All three sides of the conversation were fed into a public address system.

Fargo and Valley City, North Dakota and North Platte and two other Nebraska towns were represented as well as a dozen South Dakota points. Everybody had a swell time.

Massachusetts State Convention, Provincetown

PROVINCETOWN, on Cape Cod, must be a rather cramped and over-full little town even in the dead of winter. One simple way to turn the village upside down and inside out is to give it some typically beautiful summer weather, bring in about 30 ships of the U. S. Scouting Fleet and then stage a swell ham convention. All those things happened simultaneously on July 28th and 29th.

Sponsored by the Provincetown Radio Club, the convention provided a high time for the several hundred that attended. The technical session, under the wing of New England Division Director

George Bailey, brought forth a wealth of dope. Mr. Fletcher of the New England Telephone and Telegraph Company described in detail the new directive 63-mc. telephone link between the Cape and Boston (and did everybody prick up their ears!); John Reinartz covered all sides of the blackboard with circuits and ideas and Mr. MacDonald of the Lighthouse Service gave the inside



R.S.G.B. CONVENTIONETTE, HELD AT BIRMINGHAM, ENGLAND, MARCH 18TH

From left to right in the front row are the following: (1) G2DV; (3) G6LI; (4) G2OA; (6) G6JQ; (7) G6LL; (8) G6CL, Sec'y R.S.G.B.; following, in order, G5VM, G5BJ, G6NJ, G5NI and G6CJ. Directly in back of G6CJ will be seen G5ML, and at his right, G6ZL. Second row, left to right: G2AK, and at his left in back row is G5TL.

story of radio beacons. K. B. Warner and Ross A. Hull of Headquarters also talked.

Warner chaired the evening session at which Lt. Myers, U.S.N., lead off with an illuminating description of the part radio plays in Naval maneuvers. Mr. Meeder of the Naval Communications Reserve then discussed the activities of the Reserve and opened the way for Dick Purinton of Raytheon and Arthur Lynch to continue the technical program. Reinartz followed with a fine showing of his oscilloscope. One highlight of the evening was a demonstration and talk by Theodore McElroy, for many years the world's fastest radio operator. Distribution of a couple of truck loads of prizes carried activities late into the night.

An important feature of the gathering was the presence of many mobile 56-mc. stations. Rag-chewing between the cars around town and en route provided a brand new thrill and left all the gang wildly enthusiastic about mobile work.

—R. A. H.

Perth Amboy, N. J., Hamfest

ONE of the largest body of radio amateurs ever assembled gathered on the waterfront at Perth Amboy, New Jersey, on June 16th and established a world's record in hamfests. There were 950 paid admissions to the Tri-County Radio Association hamfest; our personal count showed more than a thousand people in the main

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What the League Is Doing

League Activities, Washington Notes, Board Actions—For Your Information

Election Notice

To all A.R.R.L. Members residing in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain and West Gulf divisions of A.R.R.L.:

You are hereby notified that, in accordance with the constitution, an election is about to be held in each of the above-mentioned divisions to elect, for the 1935-1936 term, both an A.R.R.L. director and an alternate director. Your attention is invited to Sec. 1 of Article IV of the Constitution, providing for the government of A.R.R.L. by a Board of Directors; Sec. 2 of Article IV, defining their eligibility; By-laws 10 to 20, providing for their nomination and election; and By-law 11, providing for the simultaneous election of an alternate director. Copy of the constitution and by-laws will be mailed any member upon request.

Voting will take place between November 1 and December 20, 1934, on ballots which will be mailed from the headquarters office in the first week of November. The ballots for each division will list, in one column, the names of all eligible candidates nominated for the office of director by A.R.R.L. members residing in that division; and, in another column, all those similarly named for the office of alternate director. Each member will indicate his choice for each office.

Nomination is by petition. Nominating petitions are hereby solicited. Ten or more A.R.R.L. members residing in any one division have the right to nominate any member of the League residing in that division as a candidate for director therefrom, or as a candidate for alternate director therefrom. No person may simultaneously be a candidate for the office of both director and alternate director. A separate petition must be filed for the nomination of each candidate, whether for director or for alternate director. The following form for nomination is suggested:

(Place and date)

Executive Committee

American Radio Relay League
West Hartford, Conn.

Gentlemen:

We, the undersigned members of the A.R.R.L. residing in the Division, hereby nominate of, as a candidate for director [or for alternate director, as the case may be] from this division for the 1935-1936 term.

(Signatures and addresses)

The signers must be League members in good standing. The nominee must be a League member in good standing and must be without commercial radio connections: he may not be commercially engaged in the manufacture, selling or renting of radio apparatus or literature. His complete name and address should be given. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon of the first day of November, 1934. There is no limit to the number of petitions that may be filed, but no member shall append his signature to more than one petition for the office of director and one petition for the office of alternate director.

Present directors from these divisions are as follows: *Central*, Mr. Loren G. Windom, W8GZ-W8ZG, Columbus, Ohio; *Hudson*, Mr. Bernard J. Fuld, W2BEG, New York City; *New England*, Mr. G. W. Bailey, W1KH, Weston, Mass.; *Northwestern*, Mr. Ralph J. Gibbons, W7KV-W7BIX, Portland, Oregon; *Roanoke*, Professor H. L. Caveness, W4DW, Raleigh, N. C.; *Rocky Mountain*, Mr. Russell J. Andrews, W9AAB, Denver, Colorado; *West Gulf*, Mr. Frank M. Corlett, W5ZC, Dallas, Texas.

These elections constitute an important part of the machinery of self-government in A.R.R.L. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choice. Members are urged to take the initiative and file nominating petitions immediately.

For the Board of Directors:

K. B. WARNER,
Secretary

August 1, 1934

C.C.I.R. The third meeting of the *Comité Consultatif International des Radiocommunications* will be held at Lisbon, Portugal, in September and October. Amateur radio is to be represented by the International Amateur Radio Union, which the recent Madrid conference admitted to participation. The Union will be represented by its secretary, Kenneth B. Warner, and James J. Lamb, *QST*'s technical editor, as technical advisers. Their trip is financed by an appropriation made by the Board of the A.R.R.L., which is the headquarters society of the Union.

The C.C.I.R. is a creature of the International Telecommunication Convention and generally meets every five years midway between the conferences held to revise the international regula-

tions. It does not have the power to make binding decisions, but it studies technical questions, and administrative questions—the solution of which rests primarily upon technical considerations, and makes technical findings which are issued in the form of “opinions.” Some three dozen questions are slated for discussion at the Lisbon meeting, ranging from pure science to such commonplace things as the cure of key clicks. The special significance of this meeting to amateurs is that it represents the first occasion upon which we have been admitted to participation in the work of the C.C.I.R. in our own name as amateurs—one of the achievements of A.R.R.L. and the United States delegation at the Madrid Conference.

Foreign Traffic

Third-party traffic with Peru is now permissible. The Department of State has negotiated a special arrangement for us, at the initiative of the League, and it is now agreed that amateurs of Peru and the United States may interchange messages on behalf of third parties, provided that such messages are of the character that would not normally be sent by any existing means of electrical communication, nor except for the availability of the amateur stations, and on which no compensation is directly or indirectly paid. The arrangement applies to the United States and its territories and possessions including Alaska, the Hawaiian Islands, Porto Rico, the Virgin Islands, the Panama Canal Zone and the Philippine Islands.

The Madrid regulations state that, except where we have a special arrangement with another country, amateurs may not handle international messages that emanate from a third party. There is, however, no restriction in the international treaty to prevent an amateur operator from originating messages himself that are destined to a third party in a foreign country. Such messages may lawfully be handled by the amateurs in the two countries concerned whether there is a “special arrangement” or not, always provided that the handling of messages is not forbidden by the domestic laws and the terms of the licenses of either amateur—which unfortunately it is in most foreign countries. Judicious use of this possibility may on occasion be of great benefit.

It is also to be noted that the control which the Madrid regulations exercise over a message relates only to its transmission by radio. There is no restriction against the handling of a message by radio to as great a distance as can be accomplished under special arrangements and then mailing it to destination. For example, a message from the United States to Singapore may be accepted by a Philippine amateur and mailed by him. Again, imagine that four countries, A, B, C and D, are parties to the Madrid convention and that a “special arrangement” exists only

between B and C. Further imagine a message originating in A and destined to a party in D. It may not be sent direct by radio, but it may be mailed from A to B, sent by radio from B to C, and mailed from C to D.

A.R.R.L.'s QSL System

First, a notice to amateurs of the fifth call area: OM Stanton, W5ACA, has found it necessary to relinquish the appointment of QSL Manager for the fifth call area, and his place will be taken by the New Orleans Radio Club, through its secretary, E. H. Treadaway, W5DKR, 2749 Myrtle Street, New Orleans. With our thanks to W5ACA for his fine pioneer work and his service to his fellow-hams during the past year, we include our appreciation of the spirit of the N.O.R.C. for taking over the work. FB, OM's.

While we're about it, we'll briefly review the system for the benefit of new hams. The A.R.R.L. sponsors a free QSL forwarding service for American amateurs, the work being conducted by volunteer QSL Managers in each U. S. and Canadian district. Foreign societies bundle up the American-bound QSL cards of their hams, send them to A.R.R.L. Hq. We sort the cards into districts, shoot them to the QSL Managers, who insert them in a file of envelopes—one envelope for each amateur—and mail the envelopes out. To get cards intended for you, purchase a standard No. 8 stamped envelope, put your name and address in the usual place on the front, *print* your call in the *upper-left-hand corner* of the face of the envelope, and send the envelope to your district QSL Manager. Don't forget to make it a stamped envelope—QSL Managers can't afford to pay postage out of their own pockets. When you get cards back, send the QSL Manager another envelope to replace the one used up. Here are the QSL Managers for U. S. and Canada:

- W1—Allen W. Jones, W1NW, 1626 Commonwealth Ave., Boston, Mass.
- W2—H. W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
- W3—R. E. Macomber, W3CZE, 418 10th St., N. W., Washington, D. C.
- W4—B. W. Benning, W4CBY, 520 Whiteford Ave., Atlanta, Ga.
- W5—E. H. Treadaway, W5DKR, 2749 Myrtle St., New Orleans, La.
- W6—C. E. Spitz, W6FZQ, Box 1804, Phoenix, Ariz.
- W7—L. W. Kelly, W7BPC, 4919 So. Prospect St., Tacoma, Wash.
- W8—F. W. Allen, W8GER, 324 Richmond Ave., Dayton, O.
- W9—H. C. DeMuth, W9FJB, 1411 Dempster St., Evanston, Ill.
- VE1—J. E. Roue, VE1FB, 84 Spring Garden Rd., Halifax, N. S.
- VE2—Stan Comach, 1088 Egan Ave., Verdun, P. Q.
- VE3—Bert Knowles, VE3QB, Lanark, Ont.
- VE4—Dr. J. J. Dobry, VE4DR, Killam, Alberta.
- VE5—E. H. Cooper, VE5EC, 2024 Carnarvon St., Victoria, B. C.

Portables Called In

Inasmuch as a license for a fixed amateur station also authorizes portable operation, separate portable station licenses are unnecessary. Many that were issued under the old regulations, before the portable privilege became automatic, are still in existence. Through the League, the F.C.C. requested that amateurs voluntarily submit these unnecessary licenses for cancellation, and many of them were surrendered. The Commission has now definitely called in all the remaining portables issued to the holders of fixed licenses, so that it may clear its records of this duplication and deadwood. Amateurs possessing separate portable licenses should now submit them direct to the Commission at Washington for cancellation.

Visiting the Members

The late summer and autumn are the convention seasons in most parts of the country, and every year at this time a headquarters representative takes the field for extended trips to visit the membership. Mr. Arthur Hebert, the League's treasurer, is engaged by the Board of Directors for this purpose. In early August, Hebie sets out on the first of two long trips. His first one, lasting nearly five weeks and covering nearly 9000 miles, takes him to the conventions of the Northwestern, Rocky Mountain, Midwest and Central Divisions, and to eleven smaller gatherings. After a rest of a few weeks he starts on an even longer trip to visit the conventions of the Roanoke, Delta, Southeastern, West Gulf and Pacific Divisions, and again a large number of smaller groups. When these trips are over he will have carried to thousands of members in hundreds of cities the latest news on what the League is doing, and through this liaison we shall have at the headquarters a renewed knowledge of the problems of the individual amateur. For eleven years this mechanism has been in operation, and Hebie probably knows and is known by more hams than any other amateur in America.

Division conventions always occur at weekends, and the fieldman on these trips visits them one each week, the intervening time being spent in travel from one to the next, stopping off to visit clubs, hamfests, and SCMs. The division conventions are like large beads on a string, or, to use an electrical analogy, it is a series circuit. To provide reasonable economy of time and money, so as to be able to afford to visit all the conventions, some systematic arrangement is necessary to put them in a series circuit. That is why the Board of Directors has established a plan that assigns the approximate dates at which the convention should be held in each division. Not meddlesome dictation, it is simply an attempt to arrange the order in which conventions are held in such a manner that it will be possible

to have contact between the membership and the headquarters at all of them. Committees arranging division conventions are requested to note that an official approved plan exists which suggests approximate dates for the convention in each division, and that the work of the League will be greatly facilitated if they will consult the fieldman before definitely setting the dates for their conventions.

Meanwhile, Hebie is "on tour" and will BCNU.

For Alaskan Hams

In Alaska the distances are great, the population is sparse and travel is difficult.

The business of finding a code examiner and a notary public, so easy for the Class-C applicant in the United States, becomes an extreme difficulty in most parts of Alaska. For some months the League has been working to improve the conditions for its Alaskan members and to this end has obtained from the F.C.C. exact information on the classes of persons authorized in Alaska to receive oaths on station applications and on the service of military officers in administering oaths for operator applications. At the intercession of the League, Rule 407 was expanded to permit giving the code examination by an operator in the government service, thus making all the "Wamecats" eligible to befriend their amateur acquaintances. Finally, the League secured from the Commission a complete list of the commercial and amateur radiotelegraph operators in Alaska whose licenses are of grades acceptable for acting as the code examiner for a Class-C applicant. All this material has been put in the form of a mimeographed memorandum, a copy of which any Alaskan inquirer may obtain upon application either from the A.R.R.L. SCM for Alaska, Mr. Richard J. Fox, Box 301, Ketchikan, or direct from A.R.R.L. headquarters.

The Communications Act absolutely requires that an application for a station license be sworn to before a notary public or a person having like authority to administer oaths. But in the case of an application for an amateur operator license only (not for a station license), the Commission will accept an application executed before a military officer authorized by the 114th Article of War to administer oaths for the administration of military justice. Hams on army posts will find this convenient, though they still have to go down to the village to get an N.P. to swear at the station application.

Blob

We read in one of the more colorful radio journals that membership in the League was originally confined to licensed amateurs but, back in 1920, was improperly and wickedly changed, for money-making motives and to the injury of members. The facts: The first constitution of the League provided that "Any one interested or engaged in radio telegraphy or

telephony shall be eligible to membership." After the war the constitution was revised, but the provision for eligibility to membership remained in exactly these words. The constitution was again revised on December 18, 1923, and at that time minor changes were made in the language: "Any person engaged in or interested in amateur radio shall be eligible to membership." This language is still in effect. There never has been a requirement in A.R.R.L. which confined membership to licensed amateurs, and neither in 1920 nor at any other time has there ever been a change in this respect. However, by a recent amendment the right to vote is substantially confined to those who are licensed amateurs.

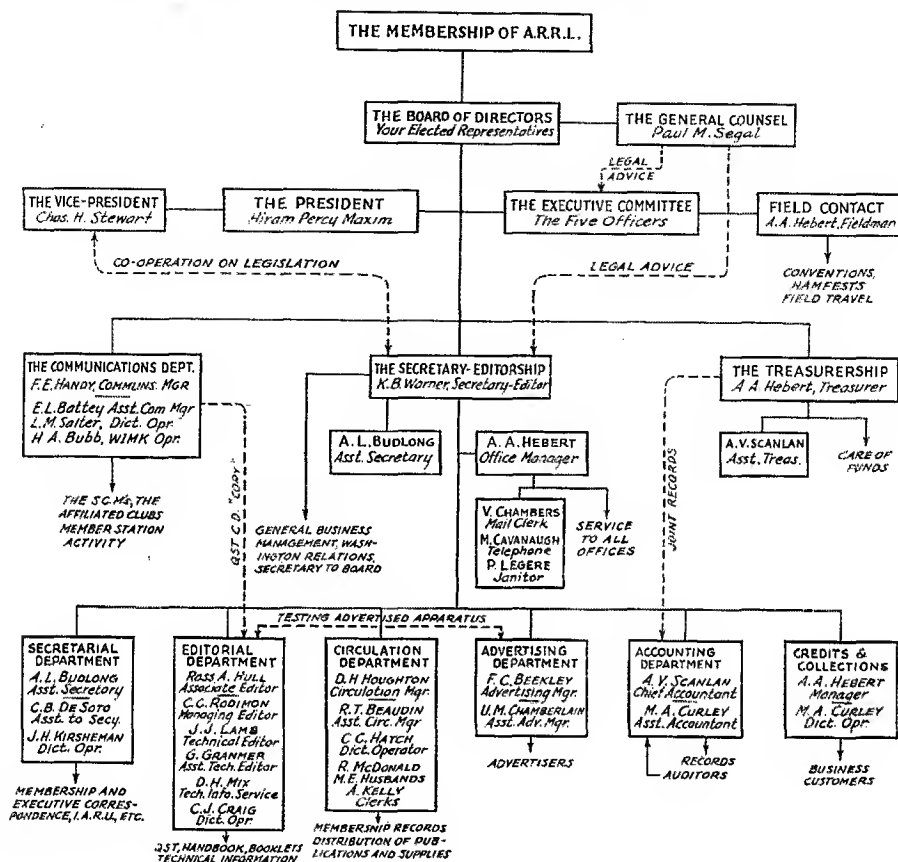
Wiring Diagram

What does the League do for me? Where do the League earnings go that are shown on these operating statements? Who are the fellows at headquarters, and where does so-and-so fit? Why are there so many of them? What do I get out of being a member?

Questions like this are frequently asked us. As an aid in answering them we have prepared

the attached hook-up of the League. In it each official of the League and member of the headquarters has been placed and labeled in his proper relation to the others. A little examination of this diagram should clear up many a member's questions.

"On top of the heap," and as the original source of authority, is the membership of the League—as it must be in a cooperative self-governing organization. The members lodge the duty of governing their affairs with their elected representatives, the Board of Directors, presided over by the president, whom the Board selects. The three salaried officers of the League—the executive secretary, the treasurer and the communications manager—head up the headquarters proper. They are appointed by the Board of Directors and in all their affairs operate under the close control of the Board. Each has his own staff to assist him in carrying out the duties assigned him by the constitution, along the policy lines dictated by the Board. These headquarters officers report directly to the Board and generally receive direct instructions from the Board. But they are also under the supervision of the



president (with his assistant, the vice-president) and the Executive Committee, as may be seen from an examination of the chart. Occasionally the Board refers some question that needs further study to the Executive Committee, whose decisions then become binding upon all the officers, and the committee also provides a place where each officer may take his problems during the year for joint solution and the mutual information of the other officers. The committee operates under a limited grant of authority given it by the Board and all of its actions must subsequently be ratified by the Board. Thus there exists rather extensive machinery between the membership and the headquarters officers, for the express purpose of translating into policy-instructions the majority wishes of the membership and of seeing that they are carried out.

In the diagram we have endeavored to show as fully as possible the work carried on by each section of the headquarters. Important liaisons are indicated by dotted lines. A little study should enable you to identify any member of the staff in whom you are interested and get a general idea of his duties.

Twenty-eight full-time salaried employees are necessary to carry on the work of the headquarters. The income of the League is derived chiefly from membership dues and the sale of advertising space, newsstand copies of *QST*, and the Handbook and other publications put out by the League at nominal cost. Most of it is expended for carrying on the work of the League, for the League has no shareholders for which it must earn dividends, and it can expend for the advancement of amateur radio all of the money that it takes in. The published operating statements of the League almost always show an annual profit, but this is only the gain from routine operations and the money thereby put into surplus is later expended by the Board of Directors for additional League projects that do not come under the head of routine operations. The aim of League management is to make a steady but quite small net addition to the surplus of the League, for "hard times," but with the realization that there is no point in building up a huge surplus and that the maximum good can be accomplished by expending available funds for the aid of amateur radio. The management problem, of course, is not how to find means to spend the money but rather how to stretch what we have to do the maximum good. Since the war the League has disbursed several million dollars in building up amateur radio and advancing the interests of its members. Annual disbursements average seven or eight dollars per member; the member pays only \$2.50 in dues (less than the cost of twelve copies of *QST* from the newsstand), the rest of the money being earned by the headquarters from permissible activities in other fields, largely advertising.

This astonishingly large per-capita disburse-

ment finances a large number of activities and services to amateur radio. It provides the money for the expenses of maintaining constitutional government, holding elections for directors, paying the expenses of Board meetings and the administrative expenses of directors in their divisions during the year. It of course provides *QST*, our own magazine with our own news, and *QST*'s laboratory where work constantly goes on to adapt new ideas to our new problems. It similarly makes available the Handbook and the several booklets of the League at nominal prices within the reach of every amateur. It maintains our Communications Department, for the purpose of coordinating our operating activities and enabling each one of us to have more enjoyment from the pursuit of amateur radio on the air—and it covers not only the headquarters end of the Communications Department but the field organization of SCMs and their appointees, and the headquarters station W1MK. It provides a constant informed watching of the interests of the amateur at Washington and in the international scene, and the representation of his interests both at home and abroad in accordance with determinations made by the Board. It provides a general headquarters for the business management of our affairs and for the distribution of general, technical and legal advice to individual members, for the encouragement of affiliated clubs, the fostering of a general spirit of fellowship and unity as manifested in our conventions, field travel, national publicity, our ability to act as the central organization of the I.A.R.U., and so on and so on.

The headquarters officers keep the directors minutely informed on all the happenings in their respective provinces, and the directors have outlined in principle, and frequently in minute specification, just what each officer is to do with respect to the things that are his part of A.R.R.L. administration. Sometimes these orders from the Board are distasteful to a group of the membership, as is only natural, but they always represent the operation of democratic self-government and are decisions taken in the interests of the greatest good to the greatest number—which is the best system of government that mankind has yet devised.

As a matter of interesting fact, A.R.R.L. is unique in the American scene—a flourishing self-governing non-commercial organization of the devotees of a marvelous hobby. We amateurs are its only owners. Our accomplishment in building it is as important as our operating accomplishments. We ought to be proud indeed of it!

Strays

W9TE thinks that R. F. Cutting, W8KQZ, should go in for high-frequency surgery!

Second A.R.R.L. Field Day Results

EARLY in June, scores of hams in each U. S. district responded to the annual call for an outing and field day test of portables. Canada was well represented, even though special permission must be obtained before VE hams can work portable on frequencies other than in the 56-mc. band.

Many affiliated A.R.R.L. clubs took the lead in plans for a trek to the lakes or hilltops. Power supplies were gathered up; portable gear brought out of storage; finishing touches added to newly constructed sets, and certain plans for the outing made, that all members might have fun and benefit in the activities scheduled nationally for June 9th and 10th. In addition to club plans, many individual amateurs took part, parties of two or three working together in most cases.

Only portable stations actually operated away from their home address were eligible to submit Field Day scores. Each contact made by a portable with a different station counted a point. The total of points was multiplied by factors (1, 2, or 3), depending on whether the transmitter or receiver, or both, were independent of commercial

brewed black coffee. The reliability, efficiency (and deficiencies too—hi) of quickly-constructed and set-up portable equipment was demonstrated. The size of the scores reported evaluates only the communications value or achievements of portable stations. Regardless of the standing of stations, every report without exception makes it unanimous that a profitable and very swell time was had by all.

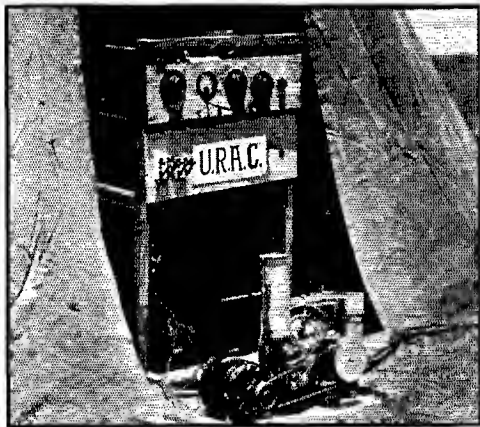
While dynamotors were popular, many battery-powered sets were in the field, and gas-engine-driven units were used in several instances.

A noteworthy item: 40% of all the portables reporting used crystal-control. Push-pull ar-



THE EGYPTIAN RADIO CLUB'S OPERATORS

The Egyptian Radio Club's, '47, 46 transmitter (also 18 watts) placed second in the country due to the efforts of (standing, left to right) W9FYZ, W9KEH, W9NDB, W9BLL, W9BPN, W9DJG, operators.



W6DIS/6

This '41 '10 3690-cc. rig with 18 watts from a 400-volt gas engine generator power supply won the A.R.R.L. Field Day, June 10th-11th.

power supply mains. Also a similar multiplier gave extra credits to stations using under 20 watts input, and suitable credit for using less than 60 watts.

Encamped in tents, in cottages, exposed to the hazards of open fields and pastures, portables were put to work. Where clubs took a holiday, part of each group handled radio operation by shifts while others indulged in swimming, sports in the open, and still others prepared camp sites or

rangements of TNT, Hartley, T.P.T.G. and Colpitts were fairly numerous. Several used the Tri-tet arrangement. In most cases a '47, 42, 41, 37, 31, or '01A was used as crystal oscillator, usually followed by a 46, '10, '45 or '12. Single '71A and '45 tubes were also used. Crystal-control, because of its assurance of "in band" operation, easy solution of the problem of obtaining frequency stability and a good note under trying conditions, proved extremely popular.

The highest scoring station, and also the runner-up for honors, both used crystal-control. The United Radio Amateurs Club of Torrance, California (W6DIS/6), located its station in the Palos Verdes Hills, 1500 feet above sea level. Fifty-eight QSOs were made. Twenty operators were present. No sleep for anyone Saturday night! A compact receiver ('77 det. and '37 audio) was used for the contest. A 400-volt d.e. generator supplied 45 mils to the final and fed the oscillator through a dropping resistor. The Egyptian Radio Club (W9AIU) reported 56 QSOs. The station was set up in the base of a bandstand in a park on bluffs overlooking the Mississippi, about 250 feet above the river. The gang made a real camping trip of it, and stayed four days. This storage battery dynamotor-operated station used the portable receivers of W9BPN and W9DJG. Three transmitters and four receivers were ready in case

of equipment failure. Both W6DIS and W9AIU used the 80-meter band. W5AI/2, station of Sidney Shore located in N. Y. C. placed third in the scoring. He used 7 mc. altogether, and while he kept the power below 20 watts, a.c. supply was used on the transmitter, which rolled up 76 QSOs during the test. VE3KC, station of the Western Ontario Amateur Radio Association, operated by VE3PA, VE3DU, VE3WW, VE3VR, VE3LW, VE3QC and VE3KC upheld the honor of Canada, making 70 contacts using '10s and a gas engine-driven generator.

A few stations attempted work in more than one band. Most, however, worked in one particular band. 48.3% of all QSOs reported in logs were in the 80-meter band. 30.7% of the work was done using 7 mc., 19% (all 'phone) on 56 mc., and 2% on 14 mc. 'Phone contacts constituted 21.7%, and telegraph contacts 78.3% of all communications reported.

56 mc., being a popular band this summer, came in for more than usual attention. The most outstanding Field Day report of 56-mc. work came from W1HDQ/1, station of Mr. E. P. Tilton. Using 112A's PP, 19 Class B modulator, and a 31 driver, he made 36 QSOs from Mt. Monadnock, at 3166 feet elevation, near Jaffrey, N. H. W1BYK/1 on 56 mc. had 27 QSOs.

The complete tabulation of scores reported credits each log of Field Day work received. We wish we might have space to reproduce all photographs and pass on the interesting data received. The best we can do is to present the winning stations and tabulate all results. Many more clubs and individual groups were in the field than last year. From Lake Tahoe to Mt. Washington hams were active.

"Enough junk to break an elephant's back—lanterns, fishing tackle, and radio. The camp site left nothing to be desired, but we found later it was a poor place for a radio transmitter. Our converter blew up rectifier tubes in rapid succession. Alternately pounded the key, cussed, fought bugs, and drank coffee all night long. Much was learned. Another? We shall start out soon as we get a power supply that won't fold up . . . pick a bald knob where there are no trees to sidetrack the soup from the antenna. More power to the Field Day."—M.A.R.S., W8KYC.

"At the end of the day the Hartley transmitter was put into the back seat of the car, and a 10-foot antenna strung up between 4-foot poles and the transmitter put on the air at every stop of the car. With only two 45-volt batteries on it, W9KWJ worked the Pike's Peak Amateur Association portable station W9OKY during the trip back to town."—W9EHC.

W4NC reports that eleven of the Winston-Salem Club turned out. They used a 500-watt a.c.



THE UNITED RADIO AMATEUR'S CLUB WITH PORTABLE W6DIS OF WILMINGTON, CALIF.

Standing (left to right): W6EZB, W6HYX, W6HBC, W6HLF, W6EDW, W6BEX, W6IGY, W6EGQ. In front (left to right): W6GVL, W6GZO, W6DIS (black sweater), W6CSO, W6FVR, W6DCF, W6IWL, W6HCF, W6CIP.

self-excited generator run by an Austin engine, mounted on an Austin chassis. This lighted Top Hanging Rock Mountain with a dozen incandescent lamps as well as giving 16 watts for the transmitter.

Among the woes of the C.I.R.C. (Lake Bloomington, Ill.) were scratched arms, torn trousers, skinned ankles, and mosquito bites. Three kittens found in a box in the cabin were accepted as mascots. "We were glad to see the end, but happy to know we had portable equipment that was reliable under trying conditions. Come on Field Day 1935!"

W6AHJ of El Cerrito operated from Lake Tahoe. W3DZK made 35 contacts with only 70 stations called, plus a few CQs. Operation was by lantern light—a swell set-up. W3QV/3 reports 56% of his calls were answered and worked. His portable was not one for the occasion only, but is kept ready for emergencies. W1BYK-ABG wants another Field Day right off. He says to keep the "simulated emergency" (preparedness) idea going strong.

W8PO says, "Ohio participation much wider this year, judging from the number of BT8 contacts made. W4BJS (Fla.), located on the gulf, used a palm tree and a century plant to hold up the respective ends of his antenna. W8DGT/4 at St. Pete (Fla.) also used an a.c. generator run from the fan belt of an Austin for power."

"Fifth place with W9NFV last year. This year a terrible showing, ruined a lot of radio stuff, had much tough luck, but never had a better time in our lives." W9AIW, W9LPZ and W9KGX kept the latter call on the air from the shore of a lake.

W3DUU, portable of the W.R.C.S., was installed at Lenape Park, Pa., with 37 in attendance, including fellows from the Chester and Frankford Radio Clubs. Wind and rain, so we decided to sue A.R.R.L. for permitting such weather . . . but after the storm there were still several hours of fun. Swimming and canoeing went best while QRN was heavy.

W9GBP/2 says 600 miles was his best DX. On the air 17½ hours, he averaged a contact every 21 minutes with P.P. '45s. The Buckeye Short-wave Radio Association's station, W8BSR, was installed at Munroe Falls Park, Ohio. W8IOI, W8KXP successfully operated W8KCS for the Boys' Club of St. Mary's. The Akron Progressive Short Wave Club ran its sets off two auto bats connected in parallel . . . they were still going strong at the end. W2DOG was set up on Bald Hill, 300 feet high, on Sunday. The transmitter was the exciter unit from the home station. W3DVY portable was battery operated at The House of Prayer, Linklin Pike and Church Lane, Philadelphia, Pa., by the H.O.P.R.S.

FIELD DAY PARTICIPATION

Club Scores		Score Nr. QSOs		Power ¹	Mains ²	Comm'l for
W6DIS/6	The United Radio Amateurs Club	322	58	18	—	—
W9AIU/9	Egyptian Radio Club	304	56	18	—	—
W9AYO	Central Illinois Radio Club	441	45+6	20 R	(10%)	—
W9OKY/9	Pikes Peak Amateur Radio Association	270	10+14+9	20	—	—
W4NC/4	Winston-Salem Amateur Radio Club, Inc.	270	30	16	—	—
W8ML	South Cleveland Radio Club	252	28	19	—	—
VE3KC	Western Ontario Amateur Radio Ass'n	210	70	210	—	—
W1GDX/1	73 Radio Club	144	16	8.1	—	—
W8BSR	The Buckeye Short Wave Radio Ass'n	140	70	40	R, T	—
W8LGR/8	Utica Amateur Radio Club	116	38+1	20	R, T	—
W8HKT/8	Ludington Amateur Radio Association	114	57	40	R, T	—
W8KGY	Sylvania Transmitting Amateurs Ass'n	108	12	16	—	—
W5SP	Abilene Amateur Radio Club	72	8	10	—	—
W8GUL	Lakewood Radio Club	63	7	18	—	—
W8DT	Mohawk Valley Brass Pounders (Ritch)	54	6	4	—	—
W8KCS/8	Boys' Club of St. Marys House of Prayer Radio Society	40	4	40	T	—
W9LEP/9	Starved Rock Radio Club	40	10	30	T	—
W8KYC	Marietta Amateur Radio Society	36	4	10	—	—
W3DUU	The Western Radio Communication Society	27	3	18	—	—
W8OW/8	Amateur Transmitters Association of Western Pennsylvania	27	3	17.5	—	—
W1GVS	Portland Amateur Wireless Association	18	2	10	—	—
OTHER LEADING SCORES						
W5AI/2	Sidney X. Shore	456	76	16/18	T	—
W8EAH/8	W8DNZ-W8EQX-W8BZL-W8EAH-W8BSH-W8IFQ	450	50	13.6	—	—
W4BNE/4	W4BOT-W4BNR	360	40	19	—	—
W1HDQ/1	Edward P. Tilton	324	36	7	—	—
W9GBP/2	R. D. Pickett	300	50	19	R	—
W3DZK/3	Richardson S. Roberts	297	33	19.8	—	—
W3QV/3	W3CTB-W3QV	252	28	18½	—	—
W1BYK/1	Al Giddie	243	27	4.5	—	—
W8PO/8	W8PCO-W8CHO-W8BAH	189	21	6.4	—	—
W4BJS/4	W4ZU-W4ZV-W4BJS	172	43	55	T	—
W8DGT/4	W1BDI/1 (Ev. Hal & Fred) 144; W1HZU/1 108; W6PFC 102; W1AWY/1 90; W1KEH/1 81; W8LWD/8 81; W1FGC 72; W8CHM/8 72; W6AHJ/8 63; W9KXG/9 54; W9EBK/9 48; W1APK 45; W2DOG/2 45; W1CCM/1 36; W1FSE 36; W1ETE 27; W1GEY 27; W8BRB 27; W9FKU/9 18; W8IGQ 16; W6FYM 15; W9NSD/9 W9RLC 14; W1GVS 9; W5DKF (W5DYU) 9; W7ASG/ W7DIW 9.					

¹ Plate input to final stage.

² Where receiver or transmitter are not indicated operation was entirely independent of public mains.

W9FYA/W9FKU would like Field Days to come every two months instead of annually. In their set-up, 20-foot poles were tied to fence posts, with the set in a couple of pup tents. W4BOT and W4BNR got the latter call on the air with a generator belted to their flivver, and a good time was had by all.

W6FYM went to the mountains, 80 miles distant, with the Modesto Amateur Radio Club. W8IGQ suggests that Field Days be held in winter, or under real emergency conditions. W9KWP would like to see an emergency rig kept on hand by every club . . . a good idea.

W4ADX was set up on Clinch Mountain in Tennessee, and got good signals from W4ABX on Roan Mountain on 56 mc. The East Tennessee Amateur Radio Association sent all local hams a fine announcement of their Field Day organization to get the gang together.

W1FSE worked four using a Pickard antenna set up on a survey marker in Amesbury, Mass. W1GEY worked some from a fire tower with a gale of wind blowing. W8LWD/8 kept the OWs and YLs sending up food. DHU and LWD got up at 3.30 a.m., but QRN was still going. W8GPT reports that W8GWY agreed to get two fish for every contact, and held up his end of the bargain!

"The S.T.A.A. (W8KGY/8) left Bradford, Pa., for the hunting camp of W8FKQ. There were several cars loaded with equipment. W8KFE, W8KOB, W8AXD, W8KDM, W8KYW, W8HKU, W8KCW, W8FVN, W8AXG, W8FEL, W8FKQ, W8JZZ and W8FDD were on hand. Looking forward to next year . . . a good time was had by all."

W8BRB of the Lakewood Radio Club furnished a most excellent and complete report. W8BON, W8GUL, W8ITR, W8FGJ and BRB had good success. Necessary to act quickly to save the set from destruction when a friendly (?) cow strolled through the antenna!

Appreciated by all will be the ditty offered by one participant as he balanced the QSOs against the "calls made": "No sadder word of tongue or pen—The QSOs that might have been."

"Had adequate battery power for a kw. W8KJL used 71A until filament went; W8HQJ used '01A with 8 watts on it; then used a '45 TNT to the end. Five autos, one trailer, 17 present." —W8ML, So. Cleveland Radio Club.

"High winds hampered operations. Rain soaked our equipment and put the transmitter out. Couldn't keep the tent up. QRN worst on record. The Utica Amateur Radio Club station was operated by W8LGR and W8CYG, with reliefs by W8HNZ, W8LUF, W8LVZ, W8LGZ, W8HNY. Six transmitters available, four used."

BT9 at the end of a call caused us to lose more QSOs than all of the conditions and what not prevailing! Had a good time anyway.—W9EBK.

(Continued on page 74)

Automatic Vacuum-Tube Regulation Control for Bias- and Plate-Supply Power Packs

By Lester R. Yates, W1KQ*

IT GENERALLY has been unsuitable to use power-pack supply for grid bias of a Class-B stage, because of the poor regulation caused by the varying grid current flowing back through the bleeder resistor of the power supply. In order to obtain decent regulation, either a very low value of bleeder resistance must be used, or else the load on the power supply must be kept at a constant value. The former method is impractical because of the very low value of resistance which must be employed, which means that a very large amount of power will have to be dissipated by it. Therefore the second method described in this discussion; that is, maintenance of the load on the power supply at a constant value of practically zero.

As shown in Fig. 1, the stabilizer consists of a tube, across the output of the power supply, in a self-biasing arrangement. The resistor R_1 is on the order of several megohms, so that at no load the tube is biased practically to cut-off. The output voltage is then the total voltage of the supply minus the voltage required to bias the regulator tube to zero plate current. When current flows back through the regulator tube, as would happen if the power supply were being used to bias the grid of a tube which was being driven positive and was drawing grid current, the voltage across the regulator tube will tend to increase. This will cause the voltage across the biasing resistance, R_1 , to decrease. Since the sum of the regulator tube drop and the drop through R_1 must equal the total supply voltage, as the voltage across R_1 decreases the bias on the regulator tube decreases, which causes the tube plate impedance to decrease so that the voltage across it tends to remain constant regardless of the current which is flowing back through it. This may be shown by the equations given in the Appendix, which were worked out for 200 volts bias on the basis of the regulator consisting of two 45's in parallel.

This equation in graphical form is shown in

Fig. 2. On the same graph is shown also the curve obtained experimentally for the same conditions.

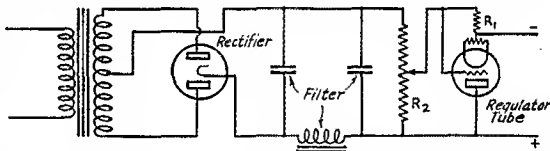


FIG. 1—CIRCUIT OF THE AUTOMATIC VACUUM-TUBE REGULATOR AS APPLIED TO A BIAS- OR PLATE-SUPPLY POWER PACK

R_1 is the regulator tube's bias resistor and R_2 is the power-pack output voltage divider. A separate filament winding should be used for the regulator. Design data are given in the text.

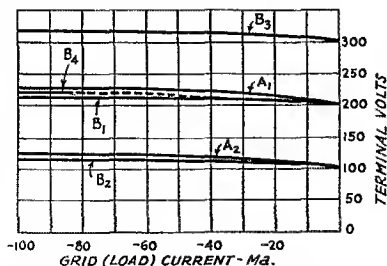


FIG. 2—REGULATION CURVES FOR A BIAS POWER PACK USING THE AUTOMATIC TRIODE REGULATOR. THE LOAD CURRENT IS NEGATIVE

Curves A_1 and A_2 are for a single 45 as the regulator.

Curves B_1 , B_2 and B_3 are for two 45's in parallel.

B_4 is a theoretical curve plotted from the equation.

It may be seen that at the higher values of current the experimental curve is slightly better than that obtained by calculation. Curves are also shown for 100 and 250 volts. It may be seen that for any given load current the deviation of the curves from the no-load value is constant, so that the regulation varies inversely as the plate voltage. At high voltages, then, it would be practical to employ only one tube as a regulator, while at the lower voltages two or more tubes in parallel

(Continued on page 88)

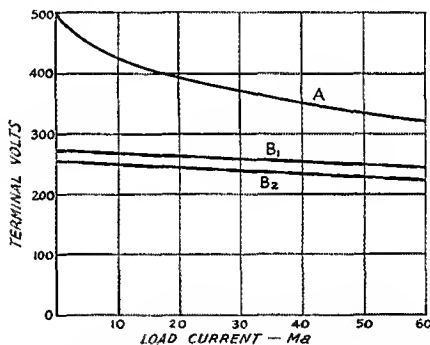


FIG. 3—TYPICAL REGULATION CURVES FOR A PLATE SUPPLY POWER PACK, THE LOAD BEING POSITIVE

Curve A was taken without the regulator. Curve B_1 is for a single 45 as a regulator and Curve B_2 is for two 45's in parallel.

* 124 Webster Ave., Bangor, Me.

Typical Technical Questions Answered

Regenerative Receiver Coils—Parallel vs. Series Plate Feed—160-Meter Tri-Tet Coils—Condenser Tuning Ranges

MANY letters received by the Technical Information Service indicate that there are many who are not familiar with the simple rules governing the winding of plug-in coils for regenerative receivers. To avoid any possible confusion, all coils, primary, grid coil (secondary) and tickler, should be wound in the same direction. The tickler coil should be placed at the "ground" end of the secondary, opposite the grid end of this winding; and if there is a primary coil, it should be wound on the form below the tickler winding. With the windings made in the same direction and with the tickler at the low potential ("ground") end of the grid winding, the top end of the grid coil should be connected to grid, the lower end of the grid coil to the filament or cathode circuit and ground, the inner end of the tickler winding to the plus-B circuit and the outer end of the tickler winding to plate. Then the inner end of the primary winding connects to ground or plus-B, while the outer end goes to the antenna or the plate of a preceding amplifier. If this procedure is followed, the tickler and grid windings always will be poled correctly for regeneration. Then if the detector should refuse to oscillate, one can look for the trouble elsewhere.

Other factors affecting regeneration are: number of tickler turns; spacing between tickler and grid windings; plate and screen voltages of the detector tube; capacity of a "throttle" or regeneration control condenser, if one is used or the capacity of an r.f. by-pass condenser in the plate circuit; size of grid leak and condenser, and degree of coupling to the antenna or a preceding amplifier.

In general, the tickler winding should be kept as small as possible consistent with smooth control and proper screen voltage. With most types of screen-grid tubes, the point of maximum regeneration or the point of "spill-over" should be adjusted to occur at a screen voltage of about 30 volts for best sensitivity. If regeneration is controlled by a variable capacity, the screen voltage should be set permanently at about 30 volts and the tickler adjusted so that the point of maximum regeneration occurs near the maximum capacity of the condenser. The tuning effect of the regeneration control will be at a minimum with this adjustment.

The value of a plate circuit fixed by-pass condenser will not be critical, a value of 100 to 200 $\mu\text{fd.}$ being about right. Larger capacities will result in a decrease in signal strength.

* * *

Several fellows, noticing the rather sudden increase in the use of parallel plate supply feed in recent *QST*-built transmitters, ask for the reason and how the efficiency of this method of plate feed compares with that of the series feed method. Practically, the entire question of efficiency centers on the r.f. choke coil used with parallel feed. Until recently this was the vulnerable point of the parallel system. Considerable difficulty was encountered in obtaining a good r.f. choke, especially one providing a high impedance over a wide range of frequencies. Within the past year or so, however, r.f. chokes of the machine-wound type with excellent characteristics over a wide range of high frequencies have become available. These chokes make it easily possible to provide a circuit with parallel feed practically as efficient as one using series feed where the responsibility of the r.f. choke is relatively insignificant.

The advantages of parallel feed are chiefly those of convenience. It obviates the nuisance of tapping the coil of a push-pull or split-stator neutralizing tank, and if the blocking condenser is used it also removes the hazard of high d.c. voltage on the tank coil and condenser.

* * *

If you wish to operate the RK-20 Tri-tet oscillator, described in *QST* for June, in the 1800- to 2000-kc. band, the coils L_1 , Fig. 3 page 16, may consist of 25 turns of No. 16 d.c.c. wire two inches in diameter. With a capacity C_2 of 35 $\mu\text{fd.}$, L_2 will require 68 turns No. 16 d.c.c. wire $3\frac{1}{2}$ inches in diameter, and proportionately fewer turns with larger capacity.

* * *

It is frequently useful to remember that the ratio of maximum to minimum frequencies covered by a given coil and shunt condenser is proportional to the square root of the ratio of minimum to maximum capacities of the condenser. The minimum capacity value should include, of course, the minimum capacity of the circuit. This rule makes it possible to approximate the frequency range over which any coil and condenser may tune.

For instance: We have a 150- $\mu\text{fd.}$ tuning condenser and wish to estimate the frequency range which will be covered. In receivers, the minimum circuit capacity may run about 30 $\mu\text{fd.}$, 15 of which may be assigned to the condenser, the remainder being introduced by tube, socket, wiring, coil etc. The maximum capacity

(Continued on page 74)

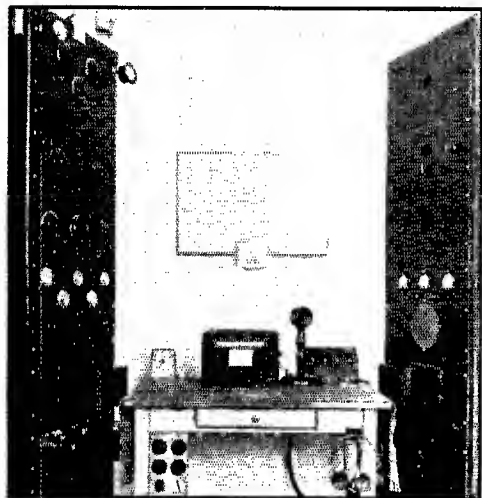


Amateur Radio STATIONS



W2DC, Scotia, New York

ALTHOUGH amateur radio possesses attractions for people of all ages, most of us get into the habit of thinking it a young man's game. Consequently it seems a bit unusual (but it may not actually be so at all) to find an amateur whose first experience with ham radio came from operating his father's station. That is the case of E. H. Fritschel, owner of W2DC. 9AJ was the call—a well-known one in pre-war days. After the



W2DC

reopening a family station went on the air signing 9FK. The year 1926 found Fritschel in Schenectady, where the call 2DC was obtained. It has been held ever since.

The layout at W2DC has a distinctly professional appearance, although some of the parts incorporated in the transmitter date back to the spark-coil days. The rack at the left of the table is a complete c.w. transmitter for 3.5, 7 and 14 megacycles. The crystal oscillator, which uses a Type 10 tube, is arranged so that any one of four crystals can be selected by a switch. An 865 buffer follows the oscillator, and drives another 10 used as either amplifier or doubler. A second 10 doubler is used on 14 mc. only. The intermediate power amplifier uses two Type 10 tubes, and the final

stage has two 211's. All stages are completely shielded. Power supplies for the r.f. stages, including a bias supply, are built in the same rack.

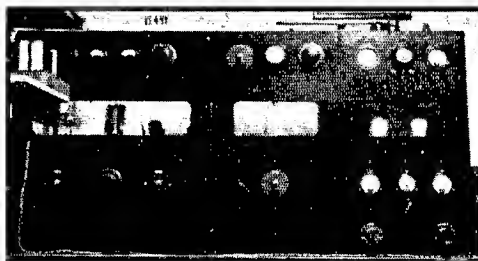
The modulating equipment is contained in the right-hand rack. The speech line-up includes a first audio stage using an 864, a second stage with two 864's, and a 56 third audio. The output of the third stage excites a 59 Class-A amplifier used as a driver for a following Class-B audio stage with two 59's. These in turn drive a pair of 203-A's in Class B. A low-voltage power supply for the 864's and the receiver is contained in this rack, also a 400-volt supply for the intermediate speech amplifiers and a 1000-volt supply for the 203-A modulators.

A broadcast-type condenser microphone and a National FBXA receiver are on the operating table. A control panel with push-button switches is at the rear right. Note also the handy rack for unused receiver coils built into the lower part of the table at the left. A frequency-meter-monitor is also available, although it does not appear in the photograph.

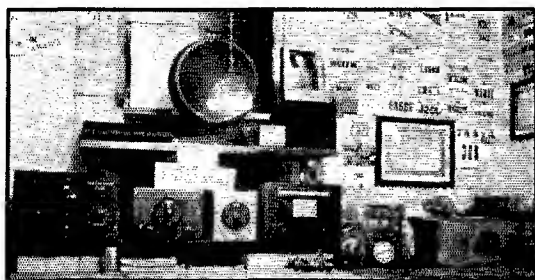
The chief purpose of the station is to maintain contact with Fritschel's father, who now signs W8ISZ, and his brother, W8AFS. Operation is chiefly on 3.5- and 14-mc. 'phone; European and South American stations being worked regularly on the latter band. Schedules are also kept occasionally on c.w. All continents have been worked on both 7- and 14-mc. c.w. W2DC holds appointments as ORS and OPS.

W4MS, Pensacola, Fla.

THE accompanying photographs show the transmitter and operating table at W4MS, the station of S.C.M. Edward J. Collins of the



TRANSMITTER AT W4MS



RECEIVING POSITION AT W4MS

A.R.R.L. Western Florida Section. Another member of the pre-war gang, Collins' first transmitter was a quarter-inch spark coil, put on the air in 1915 and operated under the self-assigned call "PB." W4MS was licensed in 1920, grew to a 1-kw. spark, thence to a.c.c.w. with the renowned "sure-fire" circuit, and finally to a 7-mc. t.p.t.g. rig with a 204-A. This set is still doing the business, bringing in T9 reports regularly along with the DX. One reason for the good signal is the fact that the tube is operated considerably below its rating—WAC has been made three times with inputs of less than 30 watts!

Besides the favorite 40-meter set, W4MS also has a pair of 10's in push-pull on 14 mc. and an 852 on 3.5 mc. Some consideration is being given to rebuilding all the transmitters for crystal control, and it is expected that a 28-mc. rig will be put together in the near future.

Quite an array of receivers decorates the operating table. Among them can be recognized a National FB7A and SW3 and an REL 231. A Pilot Wasp also is ready to be pressed into service in case of emergency. The antenna in use for all work is a half-wave 7-mc. Zepp suspended between a 65-foot lattice mast and a Florida pine.

W4MS is a member of the Gulf Coast Storm Net and boasts two second operators, Mrs. W4MS (who is also ex-W4AXF) and Hugh Anderson, W4COG. Traffic, ragchewers and beginners are just as welcome as DX.

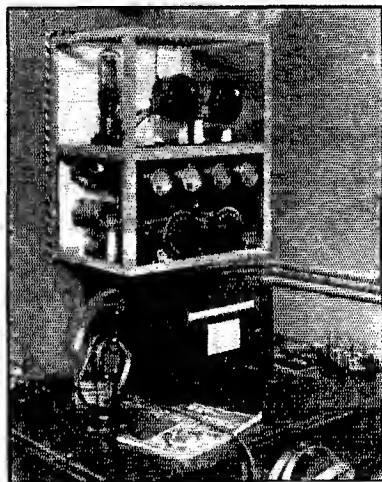
ON4BZ, Brussels, Belgium

IF YOU tune across the 14-mc. band during an International DX Contest, it's an almost certain chance that you'll hear ON4BZ, or else four or five American hams calling him. Not that one has to wait for a contest to find him on the air—far from it. In plain words, ON4BZ is one of the really outstanding European DX stations—the sort of station that seemingly everyone has heard or worked.

The layout at ON4BZ, which is owned by Guy Janssen, 295 Avenue de Tervueren, Brussels, is exceedingly neat and compact. A glance at the photograph reveals that there is nothing unfamil-

iar or "foreign-looking" about it—for the good reason that the tubes and equipment are largely of American manufacture. The transmitter, which is built in a metal frame mounted on the wall above the operating table, uses a 47 as a 7-mc. crystal oscillator, a doubler with two 46's having grids in push-pull and plates in parallel, and a 503-A final amplifier. The amplifier is usually operated with an input of 180 watts. A vertical half-wave 14-mc. Hertz antenna with single-wire feed helps to account for the DX worked. For 'phone work a Class-B modulator capable of delivering 90 watts of audio is used. This unit does not appear in the photograph, however. Single-signal reception is provided by a National FBXA.

ON4BZ first went on the air in 1923 with a Hartley transmitter using a tube similar to our Type 10; with this rig all continents were worked. Several outfits of various powers were used between the original Hartley and the set shown in



ON4BZ

the photograph. The effectiveness of the present transmitter is proved by the fact that ON4BZ has made a 'phone WAC in one day (April 21, 1934) and has worked K6COG on 'phone with a QSA5 R7 report. In the time that ON4BZ has been on the air some 125 countries have been worked. Most of the operation is on 14 mc., but it is expected that a 28-mc. rig will be installed soon.

Strays

Fellows who like the "Navy" type key knob can get the extra flange without much trouble. Simply take a poker chip, drill a hole in the center and fasten it in between the key arm and the regular knob.

—W6KBY

for the

EXPERIMENTER



Driver for Class-B 203-A's

Although the design of a speech amplifier suitable for driving successfully a pair of 203-A's as Class-B modulators would seem simple using Type 50 tubes, the complexities of the job multiply with the use of the newer and far superior (when used properly) 2A3 tubes. At W9JHY a satisfactory solution was achieved as outlined below.

In laying out the tube lineup a 57 was decided upon as the input stage tube, since it has high gain and good audio properties. This is fed into a 56 by means of any good screen-grid coupling transformer. I used an Amertran No. 641 choke with a 0.1- μ fd. coupling condenser. In the grid circuit of the 57, as the main volume control, I used a 100,000-ohm potentiometer, and isolated the grid circuit with resistances, as shown in July, 1932, *QST*.

The output of the 57 is entirely too much for the grid of a 56 tube. However, no very satisfactory way of feeding the output of a single-ended stage using a 57 to push-pull grids is available, since ordinary transformers don't "perk," and coupling transformers of that type are costly. So I used another potentiometer in the grid circuit of the 56 to control the amount of excitation to the point just below distortion.

The third stage is a pair of 56's coupled to the first 56 by a low-gain transformer (Thordarson No. 2408). The output inter-stage push-pull transformer is a type 5870 Thordarson job of low ratio, capable of transferring the power necessary to drive the grids of the 2A3's. This is more of an essential than most of the boys think, for the 2A3 tubes are operated Class AB and the grids swing positive, much as in a Class-B rig, but the plate current doesn't change as much.

The 2A3 tubes may be operated with automatic bias, but there just isn't any way to keep the bias from fluctuating with the plate current. For this reason, I decided upon battery bias, by-passing the battery with a 24- μ fd. electrolytic condenser.

I have tried just about every kind of Class-B input transformer made, but was unable to find

one with a low enough plate-to-plate impedance for the 2A3 tubes. Hence, I asked Thordarson to make up one with a 3000-ohm primary impedance, and with two separate windings on the secondary, instead of the usual single, center-tapped grid

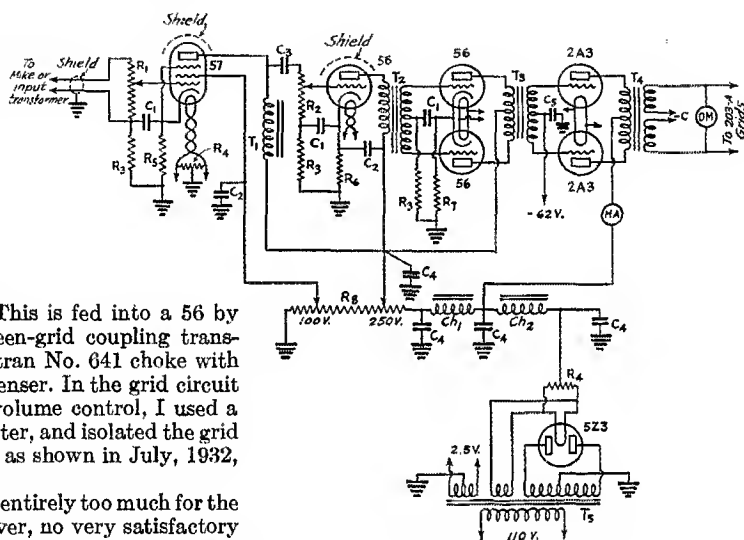


FIG. 1—SPEECH AMPLIFIER AND DRIVER FOR CLASS-B 203-A'S

- T₁—300- to 500-henry audio choke.
- T₂—Push-pull input transformer.
- T₃—Push-pull interstage transformer (see text).
- T₄—Class-B input transformer, 3000-ohm primary, push-pull 2A3's to 203-A grids.
- T₅—Plate-filament transformer, approx. 350 volts each side center tap; 5-volt and 2.5-volt filament windings (Thordarson T-5822).
- R₁—100,000-ohm potentiometer.
- R₂—50,000-ohm potentiometer.
- R₃—50,000 ohms, 1 watt.
- R₄—40-ohm center-tapped resistor.
- R₅—1500 ohms, 2 watt.
- R₆—2000 ohms, 2 watt.
- R₇—1000 ohms, 2 watt.
- R₈—20,000-ohm voltage divider, 20 watts.
- C₁—4 μ fd.
- C₂—2 μ fd.
- C₃—0.1 μ fd., 500-volt rating.
- C₄—8- μ fd. electrolytic.
- C₅—24- μ fd. electrolytic.
- Ch₁—30-henry, 85-ma. choke.
- Ch₂—30-henry, 200-ma. choke.
- MA—0.200 d.c. milliammeter.
- OM—Output meter, 0-200 rectifier-type a.c. voltmeter 1000 ohms per volt.

winding.¹ Average 203-A's just don't have similar characteristics, but with separate transformer secondaries the bias on each tube can be adjusted

¹ Type number T6140.

to make the distortion percentage as low as possible. Usually it takes about 3 or 4 volts more or less for one of the 203-A's than for the other, and a single "C" bias battery can be used instead of the two, one in each grid leak, required by a single center-tapped winding.

This unit is quiet in operation. The hum level is 1/30 volt, which you can't find with the average ear. In order to accomplish this, it was necessary to move the microphone transformer and microphone circuits to another unit, about 3 feet away from the chassis, since inductive pick-up upset the apple-cart with the high gain available.

If the speech amplifier is used near a 400-watt transmitter, it is necessary to shield both the 57 and the first 56. However, if the r.f. is not too near, it can sometimes be operated successfully without a shield on the 56.

The shield can is No. 16 gauge galvanized iron. This is heavy enough to be of some value in shielding the amplifier from an a.c. receiver left running while transmitting. Considerable trouble was experienced with the first chassis used, of 26 gauge iron. Magnetic hum was picked up from the power transformer in the receiver, and the iron wasn't so hot as r.f. shielding. The galvanizing helps a lot in keeping out stray r.f., having a much lower resistance than iron.

A 5Z3 rectifier was chosen because of its much quieter operation as compared with a Type 83 tube. An 83 was tried, but there was some tunable hum in the receiver, when the speech amplifier was left on while receiving, and in order to save the trouble of rigging up a tunable hum filter, the 5Z3 seemed the best answer. It is a great tube for such a rig.

A choke of good proportions should be used as the first filter choke. The same rules that are in vogue for Class-B circuits hold true, and without a choke capable of handling about 150 mls without dropping below 30 healthy henrys, the quality will not be so very hot.

As to frequency response, the output dropped off 3 db below 60 cycles, and increased about 3 or 4 db about 8000 cycles. So, for the ham transmitter, it gives uniform output at any frequency encountered by ham 'phones. As a thought there, the average ham mike won't give any better response, if as good, so it won't hurt if the response isn't any better. By spending a week or two on it, the response curve can be made to go as high as 10,000 and as low as 30 cycles, utilizing various schemes, but this is a lot of expense for nothing, in my estimation.

The adjustment of the potentiometer in the grid of the first 56 is rather critical, but once set may be left alone. In my amplifier, it is "below deck," out of sight.

The output meter shown in the circuit is not essential, but is useful in indicating the level at which the rig is being modulated. It need not be calibrated, but if it can be calibrated in either volts or db, so much the better. The plate meter in the 2A3 plate circuit is necessary for setting the bias properly. The tubes should draw about 78 or 80 mls, no signal, and the current should swing up to about 140 to 150 on the peaks. The plate voltage is 300 and the bias—62 volts.

I believe that this is one of the easiest to build, least costly—considering the gain available—and most fool-proof amplifiers suitable for driving 203-A's as Class-B modulators.

—M. C. Bartlett, W9JHY

A Novel Regenerative Receiver

The 2A7 tube has been put to work in a somewhat different way by Rudolph C. Coupeze, of 187-A Rue de la Victorie, Brussels, Belgium, in the circuit of Fig. 2. Although resembling in some respects the usual pentagrid converter circuit, actually the tube is used as a combined regenera-

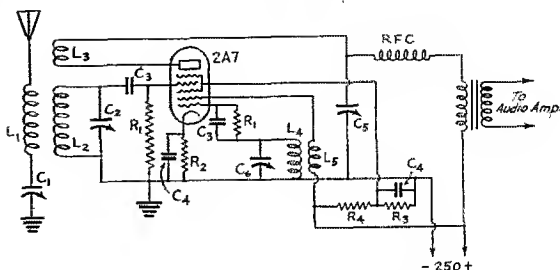


FIG. 2—HETERODYNE REGENERATIVE CIRCUIT USING A 2A7 TUBE

L1, L2, L3, L4, L5—See text for details. L1, L2 and L4 are identical for any given frequency range; ditto L3 and L5. Coupling between L1 and L2 should be variable.

C1—500- μ fd. variable condenser.

C2—See text. May be ordinary midjet for short-wave reception only.

C3—250 μ fd.

C4—0.1 μ fd.

C5—500- μ fd. variable condenser.

C6—Same as C2.

R1—5 megohms.

R2—300 ohms.

R3, R4—50,000 ohms.

RFC—Depends upon frequency band to be covered. For short-wave reception only, any good short-wave choke will be satisfactory. For all-wave work, two or three chokes in series, each designed to cover a part of the spectrum, should be used.

tive detector and beat oscillator, using the screen-grid section of the tube as the detector. It is said to work well on all frequencies between 10 and 28,000 kc., using coils and condensers of suitable constants.

The tuned circuits in the oscillator and detector portions are made exactly similar since they have to cover the same frequency ranges. Constants here will not differ from those characteristic of other short-wave regenerative receivers. To cover

the wide frequency range mentioned above, Mr. Couppez uses a tuning condenser (C_2) consisting of a four-gang 500- μ fd. condenser, all sections being connected in parallel for the lowest frequency range and either three, two or one section being used for the higher-frequency ranges up to 1500 kc. Above 1500 kc. padding condensers built into the coil forms are placed in series with one tuning condenser section to cut the effective maximum capacity to 150, 100 or 50 μ fd. so that the spread will not be too great. The changes in condenser capacity are automatically made by appropriate coil-form pin connections.

The antenna coupling coil, L_1 , is made exactly the same as L_2 , the antenna tuning condenser, C_1 , always being connected in series. Tuning the antenna circuit increases both sensitivity and selectivity. Regeneration is controlled by variable condenser C_5 , having a maximum capacity of 500- μ fd.; a 500- μ fd. fixed condenser is connected in series with it to give smoother control on the short wavelengths. Coupling to the following audio stage is apparently through an ordinary audio transformer.

The tuning procedure used with this type of circuit differs in some respects from that commonly employed for regenerative reception. The detector part of the circuit should not be allowed to oscillate; the beat note for c.w. reception is obtained by proper setting of the heterodyne oscillator tuning condenser, C_6 . The signal should first be tuned in by its carrier only, with the regeneration control well "down." Adjust C_1 to resonance and vary the coupling between L_1 and L_2 , simultaneously readjusting C_1 and the detector tuning condenser, C_2 , until the signal is strongest. The heterodyne condenser, C_6 , should then be adjusted to give a satisfactory beat note, after which the detector regeneration may be increased, by adjusting C_5 , until the signal is brought up to maximum volume. The loosest possible coupling between L_1 and L_2 usually will give the most satisfactory results.

The advantages of the separate beat oscillator have several times been emphasized in *QST*. Such an arrangement is particularly advantageous in an all-wave receiver such as the one used by Mr. Couppez, because the loss of signal strength caused by detuning an autodyne detector to obtain a beat note is considerable at the lower frequencies. A similar, although not as pronounced, difference in strength between autodyne and heterodyne reception exists even at very high frequencies, as the experimenter can easily prove to his own satisfaction.

874 For Stabilized Bias Supplies

Recent *QST* dope on "B" eliminators as bias supplies for transmitters has inspired several of the gang to send in information on using the 874 voltage regulator tube to keep the bias at a fixed value when voltage variations because of grid current flow become bothersome. For the benefit of those who may not be familiar with the tube, the 874 is a gas tube designed to maintain a constant voltage across its terminals under varying load currents, when used in connection with a power supply of inherently poor regulation—such as the conventional "B" eliminator. At a working voltage of 90, the tube will operate over a current range of 10 to 50 milliamperes.

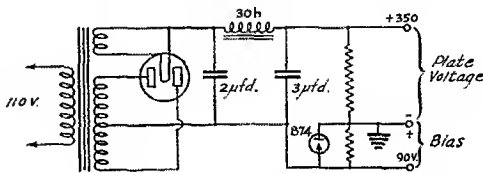


FIG. 3—PLATE AND BIAS SUPPLY USING AN 874 TUBE TO MAINTAIN CONSTANT BIAS

Fig. 3 is the diagram of a combination low-voltage plate supply and bias supply used by E. H. McRonald, W3EQS. A note from him says, "At present I am using a 'B' eliminator as a bias supply, and since the bleeder is of the order of 10,000 ohms, the regulation is fierce. After trying it I was almost ready to build one of the heavy-duty 'C' supplies when I thought of the old 874 voltage regulator tube. As this tube holds at 90 volts, it makes an excellent device for controlling the bias voltage of a 203-A or similar tube. A 5000-ohm automatic bias resistor is used in the grid return circuit and the 90 volts from the 'B'

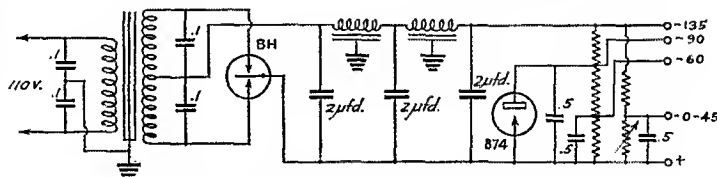


FIG. 4—ANOTHER BIAS SUPPLY CIRCUIT USING A BH GASEOUS RECTIFIER AND AN 874 VOLTAGE REGULATOR

eliminator is used for fixed bias. The eliminator also supplies plate-voltage for the buffer stages and does the job FB.

"If a higher fixed bias is desired use two or more 874's in series. The regulation of this rig is darned near perfect."

V. L. Clark, W5ZW, furnished the diagram of Fig. 4. His "C" supply, which uses a Raytheon BH rectifier and the 874, has been giving satisfactory service for more than two years. The bleeder current is approximately 20 milliamperes,

W5ZW's bias supply takes care of the entire r.f. end of his transmitter—47 oscillator, 47 buffer and p.p. 10 amplifier—and also provides bias for two 250's in the modulator.

(Continued from page 26)

F8PZ was disqualified for persistent off-frequency operation, reported by another contestant and substantiated by A.R.R.L. Official Observer reports. It is regretted that his score of 12,376 cannot be counted. Although W6FYT made a score in the vicinity of 23,000, no log was received from that station. W3ZD, although not competing, had a score of 11,100.

NOTES OF INTEREST

J2GX worked 249 different stations! ZS2A had 244 QSO's! These two chaps made more than one amateur happy by adding Asia or Africa for WAC awards! EA5BE, prominent Spanish participant, made 532 QSO's. A tidy number! Coincidence at G2ZQ: Betting the numbers 444444 twice and 222222 once. On each of the nine days of the tests

G6QB used a different type antenna. G6LK's power supply consists of dry batteries; at the end of the contest there was more resistance than voltage! G6WY made six contacts in succession without touching the receiver—the W/VE hams were piled that thick!! ZT5R, being an Emergency Station, did not have much time for the tests; he was busy with traffic. D4BAR made 291 QSO's. D4BIU wonders why the Yankees use such a narrow portion of the 7-mc. band; he found about 90 to 95% of the W's worked between 7000 and 7100 kcs. W6EMK was visiting HB9J and did some of the contest operating there. W6's are rarely heard in Switzerland, but W6FYT and W6JJU were heard at HB9J several times. X1AA (who didn't hear that call?) made 553 QSO's. X1AM worked 291 stations. X1BC worked 160. NY1AB's snappy work will long be remembered by all who heard him in the tests—and who didn't hear NY1AB? K4SA worked 309 stations, using 'phone on 14 mc. as well as c.w. on 7 and 14 mc. K4KD, with no more than 30 watts input, worked 169 stations (51 on 7 mc., 118 on 14 mc.). CM2JM made 251 QSO's, CM1ML 201 (with 20 watts input!). F3MTA, only station on the air in Martinique, rolled up 284 contacts. ZL2CI and ZL4AI had a fast race for New Zealand honors; ZL2CI worked 344 stations, ZL4AI 326, but ZL4AI came out with a bigger score, thanks to contact with an additional district. ZL4AO and ZL4AI are located about 300 yards apart and were both on at the same time throughout the tests! The "longest" contest report came from HC1LC: it consisted of several sheets of paper pasted together, measuring about 82 inches long!! HC1LC worked 457 stations. What ham doesn't envy K6JPT his

X1BC	(13)...	6136	Newfoundland-Vo	ZL4AO	(14)...	11480	K6BFI	(12)...	8220	VK3RJ	(8)...	664	PK1VH	(*)...	84		
X1CM	(13)...	5031	V08Y	(7)...	2604	ZL2GQ	(13)...	8229	K6CQG	(13)...	6591	VK2AV	(9)...	630	PK1CX	(2)...	48
X1IN	(11)...	4060	V08AW	(8)...	928	ZL2GN	(13)...	7293	K6COP	(11)...	4087	VK2ZH	(8)...	624	SOUTH AMERICA		
X1IH	(11)...	4180				ZL3AR	(11)...	5544	K6CQZ	(10)...	3690	VK5ST	(9)...	621			
X1CC	(10)...	2040	Costa Rica-TI			ZL3CC	(11)...	5181	K6ESU	(11)...	3223	VK3OC	(8)...	541			
X2C	(7)...	742	T12KF	(10)...	2270	ZL1AZ	(12)...	4884	K6HLP	(10)...	2190	VK3BW	(9)...	576			
X1BA	(6)...	594	T12EA	(7)...	462	ZL2AR	(12)...	4104	K6JPD	(10)...	1710	VK2FM	(9)...	513			
X2R	(6)...	492				ZL4GX	(11)...	3817	K6AJA	(10)...	1530	VK3HL	(8)...	486			
X3R	(8)...	300	Brit. Honduras-VP4			ZL3AN	(9)...	2967	K6CCK	(5)...	730	VK5HG	(7)...	399			
X1BG	(7)...	238	VP4AA	(9)...	1836	ZL4CA	(12)...	2460	K6CRU	(6)...	414	VK3MX	(8)...	384			
X2B	(4)...	116				ZL2BN	(10)...	1670	K6JPT	(6)...	312	VK2HE	(6)...	360			
			Flaiti-HH			ZL4FK	(10)...	1650				VK2AO	(5)...	357			
			HH1A	(9)...	1629	ZL2PW	(10)...	1620	Australia-VK			VK2VC	(6)...	252			
						ZL2F1	(10)...	1400	VK3MR	(13)...	9412	VK2BZ	(6)...	234			
Porto Rico-K4			Jamaica-VP5			ZL2GG	(10)...	1080	VK3WL	(12)...	8124	VK2BP	(8)...	234			
K4SA	(12)...	11124	VP5CC	(8)...	1032	ZL4BT	(13)...	780	VK3KK	(11)...	7612	VK3RX	(6)...	228			
K4AD	(10)...	5070	VP5MK	(9)...	540	ZL1HY	(8)...	736	VK4GE	(12)...	6312	VK3CX	(6)...	180			
K4QOP	(10)...	3528				ZL1CK	(7)...	630	VK3ES	(12)...	5016	VK2TH	(5)...	125			
						ZL3HK	(8)...	624	VK5PE	(10)...	3690	VK3ZZ	(4)...	84			
Cuba-CM			Alaska-K7			ZL1AK	(8)...	504	VK2OF	(11)...	3663	VK4EI	(3)...	72			
CM2JM	(14)...	10403	Z7CHP	(4)...	984	ZL1HD	(8)...	480	VK7NC	(11)...	3454	VK2FO	(3)...	24			
CM2OP	(10)...	12960 ⁷²	K7ANM	(*)...	10	ZL2PC	(5)...	305	VK5MY	(10)...	2460	VK3EM	(1)...	3			
CM1ML	(10)...	6030				ZL2MR	(7)...	259	VK2XC	(10)...	2370	VK3HM	(*)...	3			
CM2FA	(10)...	5720	Bermuda-VP9			ZL3FK	(6)...	198	VK3QG	(11)...	2365	VK3HQ	(1)...	3			
CM2MG	(11)...	3740	VP9R	(8)...	792	ZL1CC	(5)...	105	VK3ML	(9)...	2270						
CM2MA	(11)...	3432				ZL2HR	(3)...	84	VK2PX	(9)...	2255	Philippine Island-KA					
CM2AN	(10)...	1710	Bahamas-VP7			ZL1BA	(3)...	72	VK7JB	(11)...	2112	Brazil-PY					
CM2WW	(7)...	539	VP7NB	(7)...	455	ZL4FW	(5)...	70	VK4UJ	(11)...	1947	KAINA	(9)...	4644	PY2BN (12)...		
CM2NA	(7)...	441				ZL1FT	(3)...	63	VK4BB	(10)...	1900	KAICS	(2)...	228	PY1AV (10)...		
			Virgin Islands-K4			ZL3FY	(1)...	12	VK7RC	(11)...	1672	KAIRC	(3)...	117	PY2BX (10)...		
			KA4AN	(5)...	200	ZL2CW	(2)...	12	VK2DR	(9)...	1485				1400		
									VK2FZ	(9)...	1401	Chile-CE					
			OCEANIA						VK2OC	(9)...	1098	CE7AA (7)...					
Panama-HP						Hawaii-K6						OM2AA (7)...					
HP1A	(11)...	7667				K6DKK	(12)...	9648	VK2JT	(8)...	768	3529					
			New Zealand-ZL			K6HQO	(12)...	8748	VK2YL	(9)...	729	Guam-OM					
Barbados-VP6			ZL4AI	(14)...	13650	K6BAZ	(12)...	8424	VK3KR	(8)...	720	OM2AA (7)...					
VP6MR	(9)...	4491	ZL2CI	(13)...	13273							Java-PK1					
												PK1HG (2)...					
												166					
												CX2AM (10)...					
												CX2AF (2)...					

110-foot poles?! PAASD spent what little time he had available on 3.5 mc., working W2ETH and W1BKL. KAINA worked 180 stations, but only two of these used "break-in." Break-in should be more generally used, since it makes more contacts possible in the same number of operating hours. VK7RC is one of those hams who always strikes bad luck at contest time; the first three contest nights he had bad power QRM, and on the fourth night his territory was visited by the worst electrical storm in years; these things didn't help his score a bit! A common question: "What end of the band do you hear foreigners on?" Bill Conklin of W9FM/W9ZA made up two charts, one for the 7-mc. band, one for 14 mc., using the dial settings on his receiver to show where each foreign station heard came in. On 7 mc. in the a.m. hours, foreign stations were distributed over almost the entire band with the exception of the 7000-kc. end, where a fairly vacant space showed up. In the p.m. hours the majority of the foreign stations were logged between 7000 and 7200 kcs., with a few scattering signals upwards to 7300 kc. On 14 mc. the a.m. hours found foreigners all over the band with very few "holes," while in the p.m. the entire band was covered, but there were more "open spaces." Eric Trebilcock, inveterate listener of Moonta, South Australia, logged 47 countries during the tests, bringing his total of "countries heard" to 97! A very complete log of stations heard was received from Germany Receiving Station DE1374D. W8AYD claims the prize for being the "most persistent ham"—he called 54 different stations, but didn't work a single one during the contest. The old evil of a.c. notes, while less than in previous years, was still present . . . do the offenders remove the filter, or in crumming up coupling and raising plate voltage do they *blow* the filter? A more potent factor in producing a real score is a real receiver, not brute power, or a broad note. VP2RT and VP2BX helped a few scorers to add Antigua to their lists. ON4CSL in the Belgian Congo also furnished "another country" in several cases. DX CQ's by W and VE participants were found generally less productive than answering CQ's and "test" calls from foreign stations. Long CQ's wasted everybody's time and lost points for many. It has been suggested by several that W and VE stations be prohibited from calling CQ in future International Competitions. How does the gang as a whole feel about that? The comment found in oodles of logs: "I never heard so much DX in my life." J3IW was only Asian heard at W1FH. W1CMX heard 58 countries, worked 37 of them; he worked J2GX at 4:30 p.m. Eastern Time on 14 mc. W1WV's average on calls per QSO was 5: 200 calls and 40 QSOs. Best DX heard at W1DUJ on 14 mc.: KA3AB. W1BUX made WAC in thirteen hours. The original holder of the call 1MK was in the tests under the call W1HQK. The greatest thrill for W1QV was an

R10 report from OK1AW. VK3MR came rolling in on the speaker on 7 mc. at W1DCI, on March 18th, from 3 to 4:30 p.m. On the same date W1CNU worked VK5SU and heard another VK between 5 and 6 p.m. E.S.T. W1DMD, Concord, N. H., was QRM'ed by static reducers at the Rumford Press (printers of *QST*!), but he managed to hear 181 stations in 41 countries, all six continents. Although 30 countries were logged at W1DGC, there were no South Americans among them. Best foreign operators heard at W1CMX: NY1AB, ZS2A, EA5BE and *nearly all VK and ZL operators*—a bouquet for our friends from "down under"! W2BSR took his vacation during the contest in order to avail himself of the utmost fun—he rebuilt before the contest, but had to tear the rig all apart and rebuild again after the contest started—moral: leave well enough alone! W2ALB's 33 contacts were all by answering CQ's. W2FU suggests a "Boobie Prize" for the U. S. hams who CQ'd by the hour. The greatest lesson W2DJM got from the tests was that it pays to use all bands. W2DC's only phone QSO was with ON4AU. W2BYP, W2BHZ, W3ZJ and W4AJX worked all continents. 154 foreign stations were heard at W2DZA, 219 calls made, 49 QSO's. W2CLM and W1DGC worked VK the long way around. W2GWE was operating portable at Princeton University, surrounded by BCL's numbering in the hundreds—imagine his grief! W2ALB's examples of good operators: ZS2A, EA5BE, EA1BC. To his mother W3AOJ gives 90% of the credit for his score: she was his "alarm clock," waking him in the wee sma' hours so he wouldn't lose out on the elusive DX. W3BAI recalls: EA5BE's beautiful sending, FM8IH ditto. . . . The eternal "book on key" artist, "key sitters" we call 'em. . . . VK3MR coming in at 5:30 p.m. E.S.T. . . . Calling OM2AA—as futile as trying to thread a needle with a three inch hawser. . . . Plate transformer couldn't take it! . . . Orchids to W3DRK for staying off 7 mc. to avoid QRM to W3BAI. . . . Real ham spirit! . . . W3DON loans his transformer to replace the burnt-out one. . . . 50 W/VE stations calling F3MTA on the 17th. . . . Over 40 prefixes heard and 140 stations! "Little score, big fun," says W3AWS. Bedlam: the self-excited boys slashing up and down the bands looking for the mythical hole in the QRM. W3BRU made his first ZL QSO after ten years of hamming. The contest nights reminded W3APJ of a drive over the Everglades, with "millions of frogs, big ones with bass voices, little ones with shrill peeps, all exercising their vocal ehords." W3APJ worked 28 countries out of 41 heard. W4CBY's last six QSO's in the contest were each with a different continent! A disconcerting overture: W4AJX' 66-foot mast smashing to the ground three days before the tests! W4AIO and W4ABV divided time and made a local competi-

(Continued on page 70)

• I. A. R. U. NEWS •

Devoted to the interests and activities of the

INTERNATIONAL AMATEUR RADIO UNION

President: H. P. MAXIM

Vice-President: C. H. STEWART

Secretary: K. B. WARNER

Headquarters Society: THE AMERICAN RADIO RELAY LEAGUE, West Hartford, Conn.

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Nederlandsche Vereniging voor Internationaal Radioamateurisme
Nederlandsch-Indische Vereniging Voor Internationaal Radioamateurisme
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Sveriges Rundamatörer
Unión de Radioemisoros Españoles
Union Schweiz Kurzwellen Amateur
Wireless Institute of Australia

Conducted by Clinton B. DeSoto

Calendar:

The business of the I.A.R.U. is conducted by three mediums. First, there is individual correspondence between the headquarters and the member-societies. Second, there are general letters sent by the headquarters to the officers of member-societies. Finally, there is the semi-annual official Calendar, in which the affairs of the Union are reviewed, and official acts proposed and acted upon.

Calendar No. 12 of the Union was issued June 30th. The principal subject under consideration was the representation of the I.A.R.U. at the coming C.C.I.R. Conference to be held in Lisbon from Sept. 22d to Oct. 10th. It will be the first such conference to which the Union will be admitted on its own authority; as has been previously pointed out, this constitutes a considerable forward step in the international recognition of amateur radio.

Unauthorized interference in amateur bands and an international solution to the problem proposed by the R.E.F. was the second major subject considered in this Calendar. The result of voting on a previous proposal for the admission to membership in the Union of the *Liga Colombiana de Radio Aficionados* (L.C.R.A.) of Colombia was reported as unanimously in favor. A cordial welcome to the roster of I.A.R.U. member-societies is extended to the L.C.R.A. on behalf of the rest of the Union membership.

The Japanese Amateur Radio League (J.A.R.L.) was proposed as the Union member for Japan, by the Headquarters. The R.S.G.B. proposed a change in the voting requirements, under the constitution; it also made a suggestion with regard to the establishing of qualifications for the issuance of WAC certificates. The question of

geographic determination of continental land areas in this connection was discussed by the headquarters. General discussion by several member-societies on questions relating to the handling of QSL matters was presented.

Results of voting and the compilation of expressions of opinion on the part of member-societies resulting from this Calendar will appear in the December Calendar, and shortly thereafter in this department of QST.

WAC:

The world is WACing at a terrific rate these days. So far in 1934, 180 certificates have been issued — as many as in any previous year heretofore. The last hundred of those have been issued in less than two months. I.A.R.U. Hq is swirling with a whirlwind of new WAC certificates. The grand total of WAC Club members on July 20th was 1204. New applications arrive with every mail.

There are three new 'phone WAC's. Charles G. Myers, W3CCF, is the first American to accomplish the feat. His certificate was issued May 15th. On June 12th one was issued to I. E. Hill, who worked all continents on 'phone from SU6HL in Heliopolis, Egypt. He'd already done the same thing on c.w. from SU6HL and ST2D. Only 2nd a 'phone WAC certificate was issued to W. P. Ingersoll, W9BHT.

These bring the total number of 'phone WAC's to 11. First, there was ON4UU, March 11, 1930; then VKSHL, April 28, 1930; G5BY, June 13, 1930; GI5NJ, Oct. 11, 1930; OK2VA, Nov. 29, 1932; G6XQ, Sept. 6, 1933; ON4AU, Oct. 31, 1933; and J5CC, Dec. 15, 1933.

Why this recent boom in WAC's? Why the

issuance of more certificates in six months than in any previous year? Well, the last international DX competition had quite a bit to do with it; many Americans worked stations they'd never worked before. Did we mention, by the way, that it's principally among the American membership that this boom is occurring? Time was when considerably the greatest number of certificates issued went overseas; now, U. S. hams are greatly in the majority.

But, in final analysis, most of the credit goes to one man — J2GX. The point is reached where we no longer expect to receive an application without his card among the lot; it actually appears at least eight times out of ten. And if he's not an Oriental Santa Claus to the boys in Eastern U. S., then the New England humidity has finally submerged the last faint glimmer of reason left in this department. And that's not impossible, either.

General:

Congratulations to the A.R.R.L. on its 20th anniversary on behalf of the Executive Committee of the C.A.V. were transmitted via an OK1BC-W3BUX-W1BDI route Peruvian amateur regulations are similar to those in the U. S., writes Wray A. Gillette, OA4AA The fundamental difference is that a license fee of thirty Soles or \$7.50 U. S. is required! The W.I.A. is planning a gigantic DX contest for the four week-ends of October, in connection with the Centenary celebration of the city of Melbourne Full details on the contest rules next month; watch for them



077Z, OWNED BY H. TSCHERNING PETERSEN, POSTBOX 45, NØRRESUNDØY, DENMARK, HAS BEEN ACTIVE SINCE 1924, WAC SINCE 1928

. EX4SAX in the Saar Basin has been active recently; QSL through the D.A.S.D. W9EUZ recently worked CT1BG on 7 mc. in the middle of a hot Chicago afternoon DX'll come through at the doggonest times, sometimes! OA4V had his

equipment confiscated and license cancelled, but has succeeded in regaining the license and frequency privileges of 7500 and 15,000 kc., 'phone and c.w. International amateur radio offers congratulations to one of its best known operators, Jesus M. de Cordova, EAR96, on the occasion of his marriage to Victoria Lopez Marin Eric W. Trebbilcock,



HAWAIIAN GROUP OF HAMS

Left to right, kneeling: K6KBV, K6KEF, K6AMU, K6HCO. Back row: K6OA, K6ELN, K6BAZ, K6GNW, K6CRU, K6GHZ, K6DSF.

Moonta, S. Australia, recently heard five continents within ten minutes OA4Z is on every morning on 14 mc., looking for DX Oddly enough, Pacific stations are only rarely heard in South America, according to CX2AF "Snowy" Harrison was forced to change his call from the old familiar VK7CH to VK3CN when he moved to Shepparton, Victoria He can be reached through the Bank of Australasia Peruvian amateurs request that such "bootleg" stations as OA4XX on 14 mc. be boycotted by amateurs generally Working such stations only encourages their continuance, and the present Peruvian regulations offer no excuse for illegal operation Of the 648 stations that W2BSR has worked, only 58 are W's Braaten doesn't seem to be much of a traffic man! Amateurs handled official correspondence between the Canary Islands and the mainland for a time last May when the cable was broken In recognition of the support he has given DE official receiving stations by acknowledging their reports, the D.A.S.D. printed 250 special QSL cards for Jack de Cure, VK3WL and presented them to him XLA1Y, President of N.R.R.L., told W1SZ the other morning that he had just completed making WAC in slightly over

(Continued on page 78)



CALLS HEARD



E. F. Conyngham, Kanaga Harbor, Alaska

QTH 51° 50' N 176° 20' W

ac2rt frk3 f4lzk kalba kalhr kalme kalna kalx ka3aa
k2ndv k6hlp pk1bo vk2ng vk2oj vk2xv vk2zo vk4rq vs6an
w4tz w5vv w6ah w6am w6ame w6bbs w6cip w6dbe w6dlj
w6dre w6dtx w6due w6gaq w6byf w6ins w7aem w7bwi
w7bwg w7byw w7bhk w7dej w7due w7dzv w7hb w7js
w7wl w9bwz w9bma w9lms z13bj z13nu

*ZD2A, Capt. G. C. Wilmot, Nigeria Regiment,
Zaria
(Present address: Bryntirion, Ellesmere, Salop,
England)*

(Calls heard on train journey Zaria-Euagh)

fm8ib g2bm g2ma w2yl g5dm g6rv ob4bz ve2ca wlepe
wlz w1zz w3apj w4aio w4ajx w4chy w4tz w5af w5bzt
w5ma w5tg w8xy w9adn w9arn w9ij xlam

*W6FKC, Seth O. Perkins, and W6ENV, Andrew
H. Elsner, 1606 S. Orange Grove Ave., Los Angeles,
Calif.*

(14-mc. band)

d4bar d4bbn d4bdr d4bmj d4buf d4buk d4caf ea4av ea5be
f8eo f8ex f8gg f8pz f8rj f8tq f8wb g2bj g2bs g2dc g2di
g2dv g2ma g2oi g5bj g5by g5fv g5ni g5qa g5qb g5wy
g5xt g5yb g5yv g5yx g6bp g6lk g6ml g6my g6py g6rb
g6us g6vk g6xs baf3d la1x ly1j oeler oesfl oh3na oh3np
ok1be ok2dd ok2hm ok2ma ok2op on4au on4bz on4en
on4jb pa0af pa0ce pa0ll pa0ql pa0xf sm7ws sp1de sulec
sulsg su8hl u2pz yr5aa zd2a zslh

(7-mc. band)

er7ad zeljf zeljj zslcp zslb zslb zslz zs2u zs2d zs2f zs2h
zs2x zs2z zs4m zs4t zs5a zs5e zs5q zs5u zs5x zs6aa zs6af
zs6b zs6c zt1h zt1r zt1z zt2a zt2e zt2f zt2b zt2l zt5f zt5r
zt5v zt5w zt5z zt6d zt6n zt6x zule zulp zu5g zu5y
zu6e zu6m zu6p f8ij g2aa g2jf pa0sp

*Keith Morehead, Mount Druitt, N. S. W., Aus-
tralia*

(3900 to 4000-Kc. 'phones)

k6baz k6cib ve3hc wl1d wl1e wl2o w3blz w3bmr w4alo
w4be w4pw w5aie w6atn w6bcl w6beh w6ejq w6ers w6ez
w6djz w6dte w6egr w6ep w6etm w6fd w6fev w6goy w6jbi
w6ka w7buf w7bz w8cmd w9ez w9edw

*OK2HM, Ing. C. Haderka, Mezice near Olomouc,
Czechoslovakia*

(14-mc. band)

j2gx j2gw j2iv j2jj j3dp j5ce pk1xb uldo ulnm ve5fg vs7jg
w6adp w6cwx w6efr w6fal w6fxy w6jiv w7qc

*BRS1338, Donald W. Morgan, 15 Grange Rd.,
Kenton, Middlesex, England*

(14-mc. 'phones)

helfg hi8x cm2wz cm2qy xzl5f k4sa sulco oh2ne oh5ng la1g
veldq veldr ve2dx ve2ca ve2bg ve2be ve2ee wichi wldmn
wlz wldw wleab wldar wlabi wlcnd wlkx wibes wlaiz
wlcoo wlbmn wladw wldrl wldk wlkz wlvw w2aoe w2evl
w2dvw w2md w2goq w2gve w2aie w2tp w2aih w2kr w2byr
w2bci w2de w2coj w2egw w2emt w2edw w2im w2bkw w2akk

w2byr w3zx w3nk w3bib w3awt w3bek w3is w3coj w3ajd
w3xj w3cig w3qb w3dw w3erg w8lld w8ahu w8epd w8btt
w8pk w9nw w9gla w9gtu w9jhy w9bht w9adq w9fj w9bhm
w9usa

*H. S. Bradley, 26 Madison St., Hamilton, N. Y.
(14-mc. c.w. band)*

sulaq sulec suleg sulgp sulro sulsg suisj su3eb ulad u6ag
u6cl yu7vv

(14-mc. 'phones)

ct1by ct1gu ct2bk ealam ealbe ea3an f8dr f8jj f8vp g2ak
g2ao g2ax g2dq g2gf g2oi g2sd g2xv g5bj g5by g5ev g5ju
g5kh g5mi g5ml g5qy g5rd g5vb g5vm g5xb g5yv g5zg
g6cw g6dl g6li g6pf g6po g6py g6rb g6rl g6to g6vp g6wy
g6xq g6xr hb9aq hb9b helfg hi8x ilkl iltkm i1ul ilxx k6baz
la1g lu8dr on4abe on4ace on4au on4bz pa0im pa0kt pa0xf
py1ok py2ak py2bn xla1 xibr xlg xlm x1q x2bj

*WSAQU, George L. Schiel, 21 Midway Rd., Mt.
Lebanon, Pittsburgh, Pa.*

(14-mc. band)

vu2cp vs6aq sulsg sulch j2hi j2gx oe7ej

*Roger Legge, Jr., 20 Beethoven St., Binghamton,
N. Y.*

(14-mc. 'phones)

la1g on4bz on4apd ct1by ct1gu g5by g6li g2oi g2sd g2ax
g6py g2gf k4sa cm2wz cm2an cm2se cm2qy vp6mr xz15
lu8dr py2ak helfg oa4b py2bn xlg xla1 x1q x1dr hi8x

*W2EXQ, Bill and Dick Peacock, 81 Westville Ave.,
Caldwell, N. J.*

(14-mc. band)

j1ee j3jr

(7-mc. band)

ac8br ac8rl j1dpql

*BRS427, D. A. G. Edwards, Selwyn House,
Chester Rd., Sutton Coldfield, Birmingham, Eng-
land*

(14-mc. 'phones)

cm2an cm2qy cm2sv cm2wz hi7g k4sa py2ak sulec ve3cf
ve9be vp6mr w4ej w4ef w4si w4zf w5ahk w5anb(?) w5asg
w5bec w5yw w9aeq w9bhm w9bj w9bsz w9ecd w9ce
w9gwz w9hbd w9ji w9rv w9usa

*Tom Applewhite, Jr., 339 West 26 St., Jacksonville,
Fla.*

(7-mc. band)

kalhr k7ekt om2tb pk1bo ux2o

(14-mc. band)

j2gx vu2cp zd1n

(28-mc. band)

f8ej wla1 w1fep w4ajx w4de w4tz

*G2ATS, H. Cohen, 81 Bristol Rd., Birmingham,
England*

(14-mc. band)

w5yw w5bkg w5bu w5axq w5bmm w5aki w6aqk w6op
w6axq

W3UVA, Charles M. Waff, Jr., Box 1212,
University, Va.

(July 10th-25th)
(3.9-mc. 'phones)

xlg

(7-mc. 'phones)

helfg x1u

(14-mc. 'phones)

cm2qy cm2wz ct1by g5bj g6hy k4sa k6baz lu8dr ve2be
ve2oa ve2oq ve2dg ve2dx ve2dz ve3cf ve3ll w6cin w6cne
w7ark xlg

CX2AM, A. Mantegani, Jr., Box 37, Montevideo,
Uruguay

(7-mc. band)

k6gqv k6jpt vp5lf zslh

(14-mc. band)

w1dx wlsz w1zi w1cor w1hm w1da w1avl w2apy w2gjb
w2cif w2uk w2hsr w2cqx w3ag w3ans w3apj w4buq w4her
w4chy w5dex w5dq w5ls w5afx w6qw w6bam w6cha w6cvz
w6env w6vb w6exq w6cuh w6exw w6cnx w6hex w6wb w6am
w6fyz w6ta w6grx w6qd w6fy w6dsz w6grl w6fmu w6adp
w6sz w6ft w6mx w7vy w7ofc w7rh w8ya w8era w8ocw w8axj
w8dvz w8fve w8doi w8zv w8anq w8bti w9lor w9dov w9haq
w9hjf w9hbn w9th w9hvn w9cpq w9ij w9eay w9dhn w9gvr
w9adn w9aeb w9ih w9azs w9grv w9jfb w9are w9gfd on4cl
ve3dd ve2ax k6bag k6cog k6bfi k6vg j2hi j2in z2ci oa4z
oa4j oa4b zslb zslh

W9NY, H. F. Wareing, 4547 N. 21st St., Mil-
waukee, Wis.

(28-mc. band — July 2d-31st)

w1av w1bei w1bze w1co w1dqn w2aol w2cvf w2dtb w2fab
w2gox w2tp w3bfb w3bwd w4adt w4ajy w4arl w4bzh
w4evg w4mr w5ape w5cob w5wg w6idf w8mah w6vq w9avs
w9dhn w9dvw w9frq w9gjb w9hr w9nvq w9rol w9roo

G6YL, Miss B. Dunn, Felton, Northumberland,
England

(14-mc. band)

w5bmm w6ahz w6bax w6bvx w6byu w6cnx w6cvz w6dtb
w6env w6fke w6foz w6fyf w6iju w6qd w7vy j2gx j2hi j3dp
j5ce k4kd k5af kaler ka1re on4cl ny2ab pk1cx pk1xb
ve4du ve4nw ve4th vk2ev vk2zu vk4rv vp5pz vq4orl
vq4kta vs2af vs3ao vs3cm vs7gk vs6cf ze1jj zslh zsa4m
zs5a zs5n zs6aa xob3nq xpa0cm xzn2b xzn2c

(7-mc. band)

u2ca vpu2 xob2fj xzn2b xzn2c

Eric W. Trebilecock, Moonta, South Australia

(7-mc. band)

ac8eo cm8ck cn8ata ct1eq ct2ap ct3an d4bqc ea5bd ei8b
f8vt fb8vx fm8ih g2nm haf3d hb9ad helle ilsl j3du k4sa
k6gua kalem de6ks ok2op om2aa on4ace oz9mg paaxr
pk3lc pk4jk pk5vo sm7yn sp1du sulec ti2re u2sl ve5kl
vk2xc vk7jb vp5pz vs6aq vu7kh w5amo x1ax yi7rk yp5bb
zl3fg

W9ACN-Ex-9JL-9DLG-9EKM, Fred James
Friel, Jr., 306 S. Main St., Winchester, Ky.

(14-mc. band)

vk2ha vk2ma vk2xu vk3dp vk3hg vk4dd vk4gk vk5fm
vk5hg vk7jb zl2gn vu2cp vu2pf su1ch sulec j2ce j2gx j2hb
j2hx j7cj pk1cx pk1wb tl1ad

(28-mc. band)

w9aqd w4mr ok1aw f8cd zslb

W6ECU, Everett H. Penning, 507 Bellevue Ave.,
Porterville, Calif.

(14-mc. band)

d4har d4bcu d4hdr d4hkk d4htm d4huf f8eo f8fc f8gg f8pz
g2ma g2zq g5bj g5yh g8nj g6yl haf3d hb9y i1tkm ly1j oelcm

oe1er oe3il oh3np ok2kp on4dx on4ma on4my pa0ce pa0oh
pa0ll pa0vb u3an

D. P. Howe, Box 54, Gatun, Canal Zone

(14-mc. band)

w6axn w6evw w6dfo w6dre

(14-mc. 'phones)

wlaky wldwy w8bae k4sa relba

W. Lockerby, P. O. Telegraph, H. M. Wireless
Station, Khormaksar, Aden, Arabia

(7-mc. band)

ve1bv ve2bd vs7gj vk2hw vk2oc vk2xu vk3cw vk3gp vk3si
vk4gk vk5gw w1ajm w1ajh w1bsk w1cdx w1ch w1cmx
w1cto w1det w1dhe w1for w1fid w1gxc w1gms w1mk w1na
w1ox w1ri w1sr w1si w1sb w1ug w1ws w1zi w2ael w2afn
w2afs w2afu w2ah w2aiw w2aup w2auu w2axv w2bbx
w2bic w2bod w2bst w2chf w2cle w2cle w2cmt w2cse w2eti
w2czh w2czr w2dfg w2dmy w2dng w2dpa w2dtr w2ejm
w2eil w2epe w2fbr w2fdn w2fjk w2fop w2gam w2gfy w2gkb
w2giz w2ne w2rs w2rl w2wt w3ans w3bbb w3bcw w3bfs
w3huy w3bzu w3ath w3avj w3civ w3che w3cus w3bir
w3dd w3dau w3gfy w4ahr w4ahg w4ahy w4ajx w4agx
w4bfp w4bha w4ho w4hod w4bs w4ijx w4jxk w4pk w4we
w5apy w7cfj w8ars w8axs w8bct w8bti w8dkk w8dvw
w8dxd w8ecy w8fpw w8hwe w8ike w8kr w9aio

W2EOH, Craig B. Harvey, 311 Bendermere Ave.,
Asbury Park, N. J.

(14-mc. 'phones)

oa4b cm2qy lu8dr vp6mr ilki g5by g5ml g5zg on4au on4bz
lalq

(14-mc. c.w.)

j2gx

Thomas A. Cirimo and J. Cassalet, 1012 Morris
St., Utica, N. Y.

(14-mc. 'phones)

cm2an cm2jf cm2nv cm2ra cm2uy g5ml g5bj k4sa k6baz
lalq lu8bjc lu8dr oa4b py2ak py2bn ve5bh, ve4dl vp6mr
x1al

(7-mc. 'phones)

helfg he1fk he2rl oa4b py2ak vp5g

A.R.R.L. 28-Mc. Contest Rules

(Continued from page 17)

scored (monthly contacts with the same stations will be permitted to count), 50%. W/VE entries must be received at A.R.R.L. on or before Oct. 15, 1935. The 28-mc. band has been "hot" with dozens of DX contacts reported during each month starting with March this year. There is still time to get new 28-mc. sets built. It is easy to fix 14-mc. tank circuits to work on 28 mc. Start testing your equipment now. Report your results each week to A.R.R.L., and submit scores and log to both A.R.R.L. and R.S.G.B. at the end of the contest if you wish these to count for all awards.

Starting October 1, 1934, this International 28-mc. Contest will be in progress for one year, concluding at midnight September 30, 1935. This is open to all hams. In addition to an R.S.G.B. International Trophy and certificates to the leading ten stations wherever they prove to be, the A.R.R.L. will award a bronze medallion to the highest scoring United States or Canadian operator-experimenter.



OPERATING NEWS



Conducted by the Communications Department

F. E. Handy, Communications Manager

E. L. Battey, Asst. Communications Manager

WE HOPE you like our new heading arrangement this month. The function of this department is to pass on to you the hottest news of amateur operating achievements, to discuss operating procedure, announce tests and ham meetings, encourage good operating, publish contributions in keeping with the true spirit and ideals of amateur radio, and support amateur organization. In short, we are concerned with the practical operating of the stations of all radio amateurs.

If you don't find a report of what you did in the way of 14-mc. DX, or 1800-ke. 'phone, or on the other ham bands, herein, that will not be our fault altogether. We aim to find a way to record all outstanding work on all amateur frequencies. Your part of course will be to tell us or your Section Manager what work has been accomplished.

Better communication results in all aspects of our hobby, amateur radio, can be achieved through better operating. *The Radio Amateur's Handbook*, and also the League's operating booklet (the latter sent free to A.R.R.L. members who request it) contains lots of operating information which is being overlooked, if the number of unnecessarily long CQs we hear on the air these nights is any indication.

We don't aim to reform or change the hobby of the 'phone man, the traffic man, the DX enthusiast, the rag chewer or the experimenter. It is our personal view that all hams should know all aspects of our hobby, and be tolerant of the other fellow's viewpoint; that most hams do and are. We have noticed that sooner or later an amateur who starts in one branch of the game gets curious or fed up and aspires to try DX, try 'phone, try traffic, or the novelty of five meters, abandoning, at least for the time, his first interest in amateur radio. At times when a DX test is in progress a great many hams go after the DX fun thus made available by A.R.R.L., soon thereafter returning to their regular bent. It is our aim to benefit all concerned along the lines of his natural interest.

Briefs

Information is received from G5GQ via W3BWT that a new station signing FB8C is now working in the 14-mc. band. QRA is Paul Bour, Faravohitra, Tananarive, Madagascar. Sicim, DXers!

There are eleven amateur stations at Schofield Barracks, Hawaii, within 400 yards of each other and all work 7 mc.!!

Have you noticed? You have nine times the chance to get a fellow if you call him after his QRZ? than you have if you wait through a long (needlessly long) CQ?

W9ACN calls attention to the listing of KWT as a "marker station" in June QST. It should have read 13,750 kes., he says. Also, some of the police stations are now assigned 1706 kes.

Amateur radio with the Kansas National Guard this year operated under the call W9NI rather than the well-

known CX7 of past years. W9NI at Camp Whiteside, Ft. Riley, Kansas, maintained schedules with the following: W9PKD, W9AWB, W9IGQ, W9FRC, W9PB, W9DZI, W9OKA, W9DQJ, W9FLG, W9APF, W9EYY, W9KFO, W9GWN, W9KXB, W5FB, W9EHA, W9EFE, W9JET, W9DXD, W9LFN, W9AFD, W9BMA, W9BGL, W9YAB, W9AWP, W9BDB, W9KSY, W9FET and W9AWP. Most of these amateurs are in Kansas towns, and furnished daily contact with the homes of the fellows at the encampment. An average of about 300 messages per day was handled.

Ten hams received their diplomas with the class of 1934 at Roosevelt High School, Seattle, Wash.: W7AEA, W7BHH, W7BRT, W7BTW, W7DHR, W7EB, W7ECM, W7EFJ, W7EJV and "HK" of W7LD.

Expedition Notes Archeological Expedition

W. L. Lane, K7CCL, is radio operator with the Alaska College Department of Interior Archeological Expedition to St. Lawrence Island. The expedition will be at the island excavating an old village site until mid-September. A type 30DXB Collins transmitter will be operated under the call K7CCL on 7 and 3.5 mc. Schedules are desired with amateurs to facilitate traffic handling from the eight members of the party. Operator Lane will attempt to contact as many hams as possible. QRA is Kukulik, St. Lawrence Island, Alaska; send QSL's to Box 459, Cordova, Alaska. Be on the watch for K7CCL.

Bol-Inca Expedition

CP1GB of the Bol-Inca Expedition to Bolivia is getting into the States very well. Signals from CP1GB are usually found just inside the high frequency end of the 14-mc. band. W6WO has logged the expedition several times, first on July 5th. W8DQV worked CP1GB July 7th at 10:15 p.m. E.S.T. On July 7th W8DQV took a message from CP1GB addressed to A.R.R.L. HQs. W2GOX reports contacts on July 9th and 10th and, under date of July 18th, advised that he was maintaining a regular schedule with CP1GB. W8COB made a contact on July 22d. The latest report on the expedition comes from W3EDP, Trenton, N. J., who QSO'ed on July 23d, took a message for Trenton, delivered and returned answer within a few minutes.

Schooner Morrissey—W10XDA

14-mc. 'phone is being used practically exclusively on this year's trip of the *Morrissey* to Greenland. W2NV QSO'ed W10XDA on July 8th and 12th, and reports that W10XDA is contacting G5YH, G2SD and G5BJ as well as U. S. amateurs. W4CPZ made contact on June 17th. W3ZX has had several QSOs with the ship, handling traffic for the Navy Department. Under date of August 1st, W9EIB reports working W10XDA at Melville Bay, Greenland. He received two messages from operator Moe, W2UN, and relayed them to his home in Brooklyn, N. Y. A schedule was arranged between W9EIB and W10XDA.

Word is received of a Polish Arctic Expedition to Spitzbergen to be out the entire summer of 1934. Con-

tact will be attempted with all parts of the world. Call signals are SOB and SOE. Wavelengths between 40 and 60 meters are used. Schedules are arranged for 0000-0100, 0600-0700, 1200-1300, 1800-1900 M.E.T., transmissions being made the first five minutes of each quarter-hour. Any amateurs copying material from SOB or SOE should send same to Polski Związek Krotkofalowcow, Warszawa, Poland, Nowy Swiat 21.

"Working with cooperation of a local newspaper, hams at Sarasota, Fla., are building an emergency transmitter and receiver for use in the hurricane season in case the lines go out—which they always do. Plans will be made to communicate with other Florida stations in the storm area and also to contact hams in Atlanta who can handle United Press stuff to and from this Section. As soon as our emergency transmitter is on the air we are going to work up tests with Atlanta to be all set when the blow starts."

C. A. Service, Jr., W4—

1.75-mc. Code Practice

The Central Colorado Radio Association, Arvada, Colo., is conducting a series of code practice transmissions on the 1.75-mc. 'phone band. Call used is W9PWU, frequency 1967 kcs. Automatic sending is used and special attention is given to beginners working for their licenses. The schedule is announced as follows: August—3:30-4:30 p.m. M.S.T. each Saturday; September—6:00-6:30 p.m. M.S.T. each Wednesday and Saturday; October—3:30-4:30 p.m. M.S.T. each Sunday; November—7:30-8:00 p.m. M.S.T. each Monday, Wednesday and Friday. December (arrangements incomplete)—Experimental high-speed transmissions 5:00-5:30 a.m. M.S.T. each Saturday. Regular evening schedule to be announced later. If you are interested in these schedules, tack them up in front of your receiver so as not to forget this service offered by the C.C.R.A.

Coming Meetings

Annual Field Day, Ottawa Amateur Radio Transmitting Association. Labor Day, September 3d, will be held at picnic grounds near Lanark, Ontario. Watch for signs at Lanark. All hams are invited with their YLs, YFs, Ma's, Pa's, etc. Family groups should bring their own eats. Refreshments will be served to outside guests. Bring portable receivers for hidden transmitter hunt, also 56-mc. gear. Prizes for best portable set and for all contests. Program starts at 2 p.m. E.D.S.T. If weather unfavorable, date will be postponed until following Sunday, September 9th. Drop a card to VE3MX, 251 Fifth Avenue, Ottawa, if you will be there.

Marin Radio Amateurs, Field Day and Hamfest, to be held at McNear's Beach in Marin County, Calif., on September 16th. Cordial invitation is extended to all hams and SWLs in the San Francisco bay region. Program includes exhibits of transmitters and receivers, contests, swimming, dancing, and "gab-festings"; 56-mc. demonstration also being planned. Come one, come all!

On 1.75-mc. 'Phone

An excellent piece of 1.75-mc. 'phone work has been carried out by W6JDI, Burlingame, Calif., for over five months. He transmits on regular weekly schedule to E. B. Dell, U. S. Government Teacher at Kalskad, Alaska, sending letters and messages from Dell's friends and relatives in California. The schedule has been most reliable with only one miss in a twenty-week period; the miss then was occasioned by work on the speech equipment. FB, W6JDI!

W2CXD says to "tell the OM's to quit using 100-foot masts for antennae. How can they expect to get rid of QSB with such 'high-strung' antennae!" Hi.

The Michigan Department of Conservation credits "the amateur radio network" with making it possible to keep a forest fire near Traverse City down to a 1000-acre burn. Soon after the fire was discovered and an alarm given, the state conservation commissioner radioed a report to Lansing through W8AEQ, Traverse City. The report was received by W8JO, Okemos, and two hours later another radiogram said the fire had been placed under control. This is just one example of the work being done by Michigan amateurs in cooperation with the Conservation Department. W8JO is heading the work.

DX Data

Charlie Perrine, W6CUH/W6QD, relates: "ZT5R was worked some half-dozen times during June, usually the poorest month of the year for Africa. This makes the first year that Africa has been in continuously all year long, QSO's having been had during every one of the last twelve months. Trans-Pacific work has been hampered by poor conditions, although the poor reception has been mostly reported at the Oriental end. Speaking of trans-Pacific work brings to mind a relay we stepped into the other day. QSO VS8AQ on 14 mc. at 1600 GMT, a message was taken from H.A.R.T.S. for Jack Clarricoats of the B.E.R.U. Immediately following the VA with VS8AQ, a 'CQ G' was sent, raising G2MA going 30-per on his bug, as usual; and the QSP was effected inside of five minutes! J2GX is doing yeoman duty in providing W's with WAC."

W6FMU reports that VK2XU has worked all continents on 'phone with 10 watts input to the final stage!! This was between October '32 and June '34.

56-mc. Notes

Real DX on 56 mc.! W8EQV, Columbus, Ohio, reports logging the following stations on 56 mc. at about 6:45 p.m. E.S.T. on June 20, 1934: W1HQY, Taunton, Mass., W1GTD, Uncasville, Conn., and W2BRI, Valley Stream, L. I. Each station was on a different frequency, and W8EQV feels it could not have been a "rebroadcast." W1HQY, the greatest DX, was using a pair of '10s oscillator, modulated by a pair of '46s. Antenna was a Pickard, about 30 feet above ground. W8EQV was using a super-regenerative receiver, '37-'37-'38 tube line-up. The report checks with W1HQY's log!

W6AM is now using a pair of '45s on 56 mc. to move local traffic around Southern California after picking it up with the regular 7-mc. rig. In Los Angeles it is common practice to hear a score of 56-mc. stations in one night.

W3QV advises of some good 56-mc. work by W3AJF, Glenside, Pa., who has been heard several times by W3BDI, near New Tripoli, Pa., and W3CCH, Mt. Penn. Reading, Pa., 55 and 45 miles distant respectively. On Sunday, July 8th, W3AJF was also heard by W2VII, portable at Sam's Point, N. Y., approximately 115 miles air line. His equipment is '45s push pull, modulated by a pair of 250's.

W3AJV wants to hear from hams working on 56 mc. in cities en route to the west coast, with the idea of lining up a relay. If you will work with him, or in lining up an east-west route from your locality to connect together into a national route, drop him a card.

Automatic Relay Work

C. D. Kenter, W3ZX, sends some interesting dope on a "rebroadcast" system which he and W3COT have in operation. W3COT in Haddonfield, N. J., three miles from W3ZX, is equipped with a 56-mc. transmitter and two 14-mc. receivers. One 14-mc. receiver is always set on

W3ZX, the other is used for outside reception and includes a mixer system for rebroadcasting 14-mc. signals to W3ZX on 56 mc. At W3ZX the gear consists of a 14-mc. transmitter, a 14-mc. receiver, and a 56-mc. receiver with mixer to feed the 14-mc. transmitter with the 56-mc. signal from W3COT and to monitor him at all times. In addition to working quite a few Middle West and West Coast stations, they have worked X1G, G5BJ, G6PY, CT1BY, K4SA and ON4AU. This system is found advantageous in ordinary QSO's also, since when the station worked is transmitting he is received both at W3ZX and at W3COT, and what one misses the other gets. At times W3COT rebroadcasts his received signal on 56 mc., which makes it possible at W3ZX to listen with one earphone on the 14-mc. receiver and the other on the 56-mc. receiver! A nice piece of duplex work was accomplished with W9USA. W3ZX's signal went direct to W9USA, while W9USA's signal was received at W3COT and rebroadcast on 56 mc. to W3ZX. G5BJ and G6DL are working on a remote control system at the present time. G6DL, one quarter mile from G5BJ, will be the 56-mc. remote point.

The Official 'Phone Station Appointment

At one convention we found that some of the gang have had the erroneous idea that "O.P.S. is just a scheme to get voice stations to handle traffic." Nothing against traffic, but that *isn't* the basic idea at all. The A.R.R.L. plan is designed to give all 'phone men a real national organization of their own.

The O.P.S. group constitutes "national" 'phone organization at the same time an operating code and qualifications are not lost sight of. Through our "parties," tests, round tables, Section "before breakfast" clubs, etc., 'phone fun is increased at the same time we get somewhere in discussing more serious problems, and testing out our stations in a constructive manner. 'Phone Activities Managers have been appointed in most A.R.R.L. Sections to arrange local organization work, and to test or pass on O.P.S. applications and make suitable recommendations. Where S.C.M.'s have not yet appointed a P.A.M., voice operators should apply for the post, recommend candidates who are qualified or inquire of the S.C.M. who is their own A.R.R.L. voice-representative. If your Section Manager hasn't made this appointment it is quite possibly because you fellows working on 'phone haven't given him your ideas and asked for it yet.

The Official 'Phone Station appointment (outlined fully in Operating an Amateur Radio Station booklet) does not require traffic handling of any 'phone station operator . . . any more than a WAC certificate requires the DX-minded holder to handle traffic . . . or the Official Broadcasting Station appointee is required to do things out of his field. Naturally, since "traffic" is just putting conversations in formal shape for a relay, OBS, DXers, OO's, OPS, etc., may all handle and report some, required or not! Of course we're glad to have the dope on anything all our stations are doing . . . but we call for activity reports. These may or may not include traffic. The O.P.S. appointment does not represent unattainable standards. It stands for above-average practices in station adjustment and operation, thus helping to raise the general level of courtesy and efficiency in ham phone work.

So O.P.S. appointment is not connected with a traffic requirement, but has to do with operating fun at the same time one subscribes to high operating ideals in station practice, and at the same time it lays a sound basis for truly national phone organization.

RE TRAFFIC HANDLING BY VOICE

We have been asked about " 'phone traffic." Sure thing, handle as much as you like to . . . but don't handle it because we told you to, or because you think you have to;

you don't have to. A.R.R.L. doesn't believe in high pressuring or "forcing" ham activities. A hobby consists of constructive communications work that we like to do, not that we are obliged to do! Results of forced efforts would not last long. Success in A.R.R.L. organization has always come from volunteer cooperation along the lines of natural interest. The "traffic hound" whose specialty is message handling gets his fun from his tangible accomplishment and the schedule with a fellow "reliable." He aligns himself naturally with the O.R.S. group, for that consists of the operators who keep schedules and who have the traffic to handle. With most of us who use 'phone, traffic work is incidental; the emphasis is normally placed on rag-chewing and personal friendships, contact over the air supplemented by visits, the finest of personal and fraternal spirit. In reporting activities, by all means report any messages you may have handled in addition to giving the high points of your month's experimenting, visiting, and operating.

While on this subject, we must add the suggestion that all hams who use 'phone read Radiophone Traffic Handling (page 51, June '34 QST). It contains many thoughts for making all 'phone communication more effective, traffic work included.

Who remembers Tuska's article in January 1916 QST, "Oscillating Audions," in which he informed us that "the most sensitive audion bulbs are those which turn blue at a telephone voltage of about thirty"? Whew!

—W1AY/W9FZN/W3CVT

A.R.R.L. Official Observers

NEED a frequency cheek? Each volunteer Observer is appointed by his SCM to help all hams keep on assigned frequencies. One qualification of his appointment is that he is required to have an accurate frequency meter.

Also Observers aim to help brother amateurs by calling attention to a.c. notes, poor spacing, violations of good practice, improper broadness, over-modulation, poor speech quality, etc., in the right way to obtain maximum cooperation in bettering operating conditions, and ham enjoyment, while they operate their own stations. Observing work over the air is supplemented by sending of postal card notifications requesting cooperation. Some radiotelephone operators are asking that OO's spend more time in the 'phone bands. More properly equipped men are perhaps needed recruited from the 'phone bands. A.R.R.L. Section Communications Managers (page 5 listing) will welcome applications for appointment from properly qualified hams working in the 'phone bands.

Give one of the following men a call when you need to ask QRG?

W1ABG, W1AGA, W1APZ, W1ARB, W1ASI, W1ATF, W1AXN, W1BD, W1BHM, W1BMW, W1DMD, W1EAO, W1FTJ, W1KH, W1NR, W1QV, W1VF, W1WV, W1ZB, W1ZI, W1ZS-BZI, W2AH, W2AIF, W2AJD, W2AZV, W2BBC, W2CL, W2EGF, W2EWW, W2FF, W2LR, W2US, W2VH, W3AMB, W3AQI, W3ASG, W3BAI, W3BAN, W3BBV, W3BEL, W3BFL, W3BRX, W3CXL, W3DH, W3EDP, W3GY, W3OO, W3ZF, W3ZI, W3ZK, W4AAD, W4ADL, W4AG, W4ATS, W4AZB, W4BN-PAP, W4BOZ, W4PM, W5AIR, W5ASQ, W5ID, W5NT, W6AF, W6AEJ, W6AOZ, W6CDU-ALU, W6CHG, W6CIZ, W6DPJ, W6DQV, W6FFU, W6FW, W6GEG, W6GM, W6NFCN, W6QA, W6QR, W6RJ, W7AAK, W7ABU, W7AYY, W7BJZ, W7BRC, W7KL, W7WL, W8ACZ, W8AEL, W8AFM, W8AIJ, W8AOW, W8AWX, W8BDG, W8BFF, W8BHK, W8BIU, W8BLE, W8CIO, W8CO, W8CPY, W8CWO, W8DIG, W8DSP, W8DT, W8FMX, W8GP, W8KMT, W8NQ, W9ABF, W9ACN-DLG, W9AFN, W9AKJ, W9AND, W9AOX, W9BHH, W9BPU, W9BRX, W9CIM, W9CWC, W9CWI, W9CZM, W9DDE, W9DNP, W9DOE, W9DUD, W9ENF, W9ESE, W9ESL, W9FF, W9FO, W9HUV, W9JCH-MIH, W9JUT, W9JVP, W9SJ, CM2WW, CM8YB, K8AIU, VE2AP, VE2CX, VE3DU, VE3GI, VE5HP.

Counting Ham Traffic

A.R.R.L. traffic totals may include all traffic handled on amateur frequencies (and amateur frequencies only) which is handled with full data included by any standard form of message. That is, A.R.R.L. message form, or N.C.R. or A.A.R.S. form (when in drills or net operation using an amateur frequency) may be used, the principle being that when all essential data required by those agencies are included a message may be considered complete. In whatever volunteer work it is engaged, a station has an amateur status, and the total is a strictly "amateur" total if handled under ham-band conditions on amateur frequencies.

CLASSIFY YOUR AMATEUR, A.A.R.S., AND N.C.R. TRAFFIC

Traffic handled under a government (non-amateur) call, on a non-amateur-band frequency, should not be counted in "amateur" totals reported to S.C.M.s, but should be classified separately. Both the amateur total, and the "army" and "navy" totals, as the case may be, may be sent to your A.R.R.L. Section Manager, who invites these reports. Such totals must be clearly and separately classified, since in our B.P.L. it is our desire to avoid placing amateur-band work in direct competition with that accomplished on special frequencies.

Last December, A.A.R.S. Headquarters wrote us and queried the absolute fairness of reporting totals handled on non-amateur frequencies. It is not only the criticism that amateur operators should not be placed in competition with paid or regular army or navy operators that A.R.R.L. should avoid, but attention has recently been drawn to the fact that, given a special clear channel outside amateur-band QRM, it is easier and pleasanter to handle traffic reliably, and an unjust advantage given the operators holding such special permission over those who have to get their traffic through without the advantage of a "cleared channel."

The frequency of the transmitter is the criteria for determining the status of a station. When the transmitter is on an amateur frequency the work can be reported as "amateur" even when you work expeditions, government control stations, etc., that may be on non-amateur frequencies. Stations working with amateurs part time or full time in N.C.R. drills, or A.A.R.S. nets, using a government status and government frequency, are invited to report this work under its properly assigned call for separate mention (from strictly amateur band work of the same stations) in QST.

About Handling Messages

Message texts should be transmitted *exactly* as received. The blackest sin an operator can commit is to change a message. Do not accept messages unless and until words are spelled out completely. No abbreviations in texts is an excellent rule. It is *not* a violation of good practice to change the order of preamble though, when traffic is transferred between services. Standard amateur procedure uses the cable count check (optional). The preamble goes "CITY—STN.—NR.—DATE—CK." The NCR uses tactical procedure, and along with most other radio services, cable count check. A.A.R.S. start traffic with "NR—STN—GR—CITY—TIME—DATE" and use a "text" check like W.U. and wire services. The War Department recently told A.A.R.S. to use A.A. message form in transmitting messages between amateurs working A.A.R.S. net skeds. It was *not* ordered that this form be used for traffic work outside A.A.R.S. channels. *It is the correct thing to do to change the preamble to the form used by the service you are operating in.* This helps both accuracy and speed, and proves you a real operator.

Thus NCR messages can be changed from tactical procedure to amateur form. Thus A.A.R.S. messages will go best via straight amateur channels, in amateur form. "MO" of W6BSV sums the policy up by saying he en-

BRASS POUNDERS' LEAGUE

(June 15th-July 16th)

Call	Orig.	Del.	Rel.	Total
W9JWI	293	14	1962	2269
W2EKM	101	52	2105	2258
W9GJQ	31	90	1082	1203
W9KQ*	78	294	709	1081
W6ETL	166	413	468	1047
W8JTT	80	70	868	1018
W9KG	45	220	714	979
W8AWX	400	374	150	924
W6ALU	117	177	606	900
W6AZU	106	201	584	891
W2LK	19	48	705	772
W3BWT	92	116	485	693
W8UW	10	18	650	678
K4INA	128	52	482	642
W8DSS	83	72	486	641
W2ELK	52	177	364	593
W3BYS	309	84	182	575
W2BZZ	36	45	494	575
W8EJK	21	10	526	557
K4ITE	59	127	336	522
W6HK	30	20	452	502

MORE-THAN-ONE-OPERATOR STATIONS

K6EWQ	528	322	2436	3286
W3CXL	139	185	1477	1801
W6ZG	787	559	408	1754
K4IHR	468	305	865	1641
W6FWJ	169	68	994	1229
W5DVJ	65	32	574	671

These stations "make" the B.P.L. with totals of 500 or over. Many "rate" extra credit for one hundred or more deliveries. The following one-operator stations make the B.P.L. for *delivering 100 or more messages*; the number of deliveries is as follows: Deliveries count!

W3ANT, 162	VE5JK, 108	W3CWL, 106
W2ENZ, 145	W6BSE, 108	W7QI, 104
W1MK, 134	W9HUM, 107	W3CL, 102
W4KV, 115	VE3QK, 106	VE5CV, 101

A total of 500 or more, or just 100 or more deliveries will put you in line for a place in the B.P.L.
* May-June.

dorses the idea one should "When in Rome, do as the Romans do." If and whenever in amateur status use amateur form.

Never change message texts. In securing messages demand complete addresses. In delivering and relaying see that all words are spelled out completely. It is correct to make the order of preamble that of the service you are operating in.

The N Prefix

Wondering about the number of N stations in the amateur bands these days? Or perhaps you handled a message with N2DYV or N1AMG in the preamble?

For a United States amateur station to use the N prefix (in place of the W or K), the amateur must be a member of the Naval Communication Reserve; in addition, the use of the N must be authorized in writing by the Commandant of the Naval District, in accordance with N.C.R. regulations. Information on how to join the Reserve may be obtained by writing Lt.-Comdr. William J. Lee, Office of Chief of Naval Operations, Navy Department, Washington, D. C.

The N prefix is authorized only for use in the 1715- to 2000- and 3500- to 4000-kc. amateur bands. Its use is not confined to Naval Reserve drills or Naval Reserve traffic, however. It may be used, when authorized, by a reservist, in general amateur communication with other United States amateurs. Stations using the N prefix are subject to all the regulations of the Federal Communications Commission for amateur stations. The N prefix (when heard) indicates that these amateurs are active members of the N.C.R. This prefix is a special identifying distinction granted by the United States to the amateur stations whose reserve-member operators have met the qualifications.

Traffic Briefs

W6HRN worked the Hubbard Alaskan Expedition, K7ALT, at False Pass, Alaska, on June 16th.

The Yacht *Scaramouche* has been granted authority to communicate with amateur stations. Information on work with this ship will be appreciated.

STATION ACTIVITIES

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Jack Wagenseller, W3GS—Note new address of S.C.M. on page 5. Watch for S.C.M. Bulletin to be mailed all O.R.S. and traffic stations Sept. 1st. Due to an error, BYS' total of 506 was omitted in last month's report. BYS, alone, makes BPL this month. DQP, DBN, ERF, ESH and ETM report for first time. EPJ has universal exciter. DYX worked seven C.C.C. stations. MC retired to 56 mc. for summer. ADE is outstanding in all O.R.S. parties. EOP is building rack and panel job. DMF is constructing Tri-tet. SEOH and DIG are recuperating from illness. 3BNK is going on 28 mc. CUG is on from 3CHL as second op. 8CVS schedules N. G. camp, 8FXE. 3FIC worked ZL2CY on 7 mc. with 200 watts input; QRP to 35 watts made only slight decrease in strength to R5. 3EGA uses '03A final. All reporting stations: please include news items with your reports! SELZ is new op at 8LUL.

Traffic: W3BYS 575 DQP 32 DBN 27 ABZ 16 EPJ 2 DYX 3 MC 334 ADE 4 AQN 45 EOP 39 ERF-PSH 6 ETM 1 DWZ 34 DMF 7 EZ 122 CL 372 ECD 49. W8EOH 7 LUI 114.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA—SCM, E. L. Hudson, W3BAK—CXL keeps 15 daily schedules. BWT has 9 schedules. ASO spends week-ends in cottage on Chesapeake. EWH/OZ handles DX traffic. BGI works 28 and 56 mc. DML is new O.R.S. EIL has new receiver. DTO is building new transmitter. DRE has power leak trouble. EOG is new O.R.S., ex-O.R.S. 8VRL. CDQ attended Pittsburgh Convention. CLQ joined Army and is at Ft. Monmouth Radio School. 2CYA is back in Washington after graduating from school in N. Y.

Traffic: W3CXL 1801 BWT 693 BND 315 EKJ 59 ASO 41 EWH/OZ 25 BGI 18 BAK 15 CFZ 14 DML 11 EIL 5 CDG-DTO 4 DRE 1.

SOUTHERN NEW JERSEY—SCM, Gedney M. Rigor, W3QL—AVJ renewed O.R.S. NF keeps early morning schedules. CWL is forced off air while his hand heals. VE is going to camp. EDP holds his own for Trenton Section. ZI will be at Pine Camp, N. Y., next month, operating 8GHY. ARV gets good reports from 59 as crystal osc. and amplifier. AQC got his long cherished O.P.S. BYK finally worked a VEI. SM leaves for Panama for a year. AYZ received O.P.S. certificate. CQO works successfully with low-power 'phone. BHT is on for summer. New Maple Shape hams: ETL and ETY. BIR is O.B.S. with 500-watt c.w. station in Trenton. S.J.R.A. is having 56-mc. hunt. G.C.R.A. is having annual outing.

Traffic: W3AVJ 12 NF 37 OWL 183 VE 73 APV 175 DSC 67 EDP 28 AEJ 6 ZI 138 ARV 22 AQC-BYK 1 BYR 2.

WESTERN NEW YORK—SCM, Don Farrell, W8DSP—JTT is new R.M. and FB op. AWW had station at Boy Scout Jamboree. DSS, R.M., is running State Net. KMC visited in E. N. Y.-N. J. Sections. JTP is new O.R.S. JQE wants more schedules. BQJ is new O.B.S. on 7130 kc. EBR spends most time on DX. LUJ says receiver per June QST perks FB. JMI reports for first time. KBS is putting rig in new rack. EWP has learned Morse. ERZ was on U.S.N.R. cruise, Destroyer *Babbitt*. BHK uses low power. LWD sends first traffic report. JLG attended Atlantic Division Convention. AGS is going on cruise with U.S.N.R. BGN and AXE are active on 56 mc. ERU is on 3842 kc. GZM had

nice time on Utica Club visit. AWM says Jamestown Club going strong. BJO, R.M., is now on T.E.R.A. AAR wants traffic for Waterloo. BR is at summer school at Cornell. LGR was at Army Camp for two weeks. KKR had 1500 QSOs his first year on the air. CYT was recently heard saying, "I do." KMC handles traffic at "Y" camp. ITN gets out well on 7 mc. BDX has rack and panel job. AOW, R.M., has new Haigis 56-mc. rig. CO is building 59 RK20 for AOW. DSP is on with 59 Tri-tet and 84L. DT is doing broadcast service. New York State will be well covered by new State Net being formed by DSS, Chief Route Manager of W. N. Y.

Traffic: W8JTT 1018 AWW 924 DSS 641 KMC 391 JTP 336 JQE 110 BQJ 40 EBR 26 LUJ 21 GPS 20 VJ 19 JMI-KBS 16 EUY-JJJ-EWP 8 ERZ 7 HXE-BHK-LWD 2 JLG 1.

WESTERN PENNSYLVANIA—SCM, C. H. Grosarth, W8CUG—CMP likes the '46 in Tri-tet. CAX is new O.O. HLM is building 14-mc. 'phone. JSU won transformer at Convention. GUF went after O.R.S. Party prize. KQJ dropped new '04A and broke filament. KWA made schedule with 9USA. HGG is back with new rig. LOQ plays checkers over the air with 8IMX. GJM is doing some 56-mc. mobile work. IQB is c.e. now, 3527 kc. KSG has first-class commercial ticket. CUG is trying to get antenna back up where it belongs! CFU is trying for O.P.S. appointment.

Traffic: W8CMP 4 CAX 17 HLM 5 JSU 2 CQA 10 GUF 72 KQJ 1 YA 79 KWA 238 HGG 109 LOQ 7 GJM 2 JZZ 18 AXD 5 IQB 6 ABS 11 CUG 19.

CENTRAL DIVISION

ILLINOIS—SCM, Fred J. Hinds, W9APY-W9WR—R.M.s 9AND and 9ERU. AE, RTY, IKQ, OJJ, RDU, MFA and ANQ: rebuilding. BBR is on 14-mc. 'phone and 3.5-mc. c.w. HQH is on c.w. and 'phone. PVG got back his old eal, HB. DLO worked a couple of VKs. OXA is c.e. AND and ERU plan a busy Illinois season this fall. Transmitter all apart at KJY. KEH received cards from "I" and "VK." RCQ has new RK-20. NDB using Collins matchsupper. KIT wants to know if anyone has seen his father. PNE is back on 14 mc. OOD is moving to California. DDO and ANQ applied for O.R.S. New '52 final at DSS. OVY erected a 7-mc. Zepp. DOU and CKC are taking portables to camp. SG worked J2HJ. HUM had portable at Boy Scout Camp. WC lost his appendix. APN got R9 from LU, HC and K6. Experimenting on 28 mc. at BYZ. IEP and NIU went to Mich. with portables. JO is putting 212Ds in final of new rig. DBO is making a few BCL short-wave receivers. Flea power at IZP. PTW replaced the '10s with '45s. MLH is at 8KJA for summer. Condenser mike at AD. First reports from RVB and RPN. New receiver at BRX.

Traffic: W9HUM 402 DOU 371 CKC 173 HPG 153 USA 104 LW 92 IEP 78 DBO 71 AD-CGV 70 KEH 65 IBC 61 FO 39 AFN 36 CUH 30 NRV 29 OXA 26 HQH 20 AND 16 DDO-JZP 13 DSS-MLH 12 JO-RTY 10 ORT 9 SG 3 PTW 7 ERU-GKH 6 ANQ-LIV-NDB-RCQ-RVB 4 KIT-PBQ 2 OVY-RPN 1.

INDIANA—SCM, Arthur L. Braun, W9TE—HBK is on at Marion. EGQ is experimenting. NWB uses a 59 osc. MM has trouble with 14-mc. rig. CKG operates on all bands. AXH likes 3900 end of 'phone band. SEL is new Ind'pls hsm. SFG is a doctor at Brownsburg. FQ keeps a few schedules. LSZ is grinding rocks. GFS has new transmitter and receiver. PEF is planning 'phone rig. PEG has new 40-ft. high ant. MQQ was heard in Russia. LLV works at Logansport temp. MFW is going to join C.C.C. HSF is trying 59's suppressor grid mod. HPQ plans 28-mc. rig. PQL hears plenty DX on 7 mc. JHY was reappointed O.P.S. AEA has new rig perking. LQ has pair 800's with 500 watts input. ARK has new receiver. JZP is going to camp Knox. OKX is QRL service work. KPN wants a.c. receiver. RIG gets out FB. Phone men interested in O.P.S. write the S.C.M. Rebuilding: MQV, HUO.

Traffic: W9NWB 1 MQV 2 HTP 20 CKG-JOQ 1 AXH-FQ 6 DET 12 GFS 1 PEF 32 PEG 4 MQQ 17 HPQ 5 KPN 3.

KENTUCKY—SCM, Carl L. Pfumm, W9OX—The entire Ky. gang and the ham fraternity at large mourns the loss of 9ETD, who passed on, July 2d. The absence of his well-known and friendly voice on the air will be keenly felt by his many friends. ACN has worked 124 countries to date. AUH received Siberian QSL on QSO of two years ago, thereby making W.A.C.! BJA is back in traffic business again. EDQ is building new equipment. Sixty mile wind on Friday 13th fails to flatten BWJ's 73-ft. mast. CIM is trying for W.A.C. HAX is on duty in Chicago until Sept. 10th. CDA is getting ready for Ringe. PXX reports entire Paducah gang coming to PANIC. BAN still has an A battery in captivity. BAZ, the big whiskey man, is working on PANIC beer nowadays. AYH, HCO, NBD, NBS, ARU: rebuilding. EDV has new and higher mast. Vacation QRM's FZV. EYV reports enthusiasm for PANIC. CNE is moving out of Radio City to other end of town. HBQ is busy making reservations for PANIC attendance. FGK visited Radio City in New York. KKG and MGT combine. GLH is fishing—but no fish. CSO is installing 1.7-mc. 'phone. Radio service work QRM's GNV. ETT is selling out cheap for cash! River swallows ELL. Lightning bolt completely demolished OX's transmitter. SEPTEMBER SECOND is the date of the BIG HAM PICNIC in Louisville. Hundreds of valuable prizes will be given away. YOU be there!

Traffic: W9ACN 227 HBQ 43 AUH 34 BJA 26 EDQ 25 CNE 18 BWJ 17 KCZ 14 KOX-CKH-CIM 11 HAX-CDA-BAN 9 BAZ 7 AYH 6 HCO-EDV 5 FZV 4 PXX 2 EYV 1.

MICHIGAN—SCM, Kenneth F. Conroy, W8DYH—September: Now is the time for all good men to come to the aid of their Section. Let's bang 'em hard this season, Michigan! MICHIGAN NINES: Nice work by 9AAM, FPF, DAB and other Marquette boys on the recent forest fire. FB work at Isle Royale by 9PCU, 8JJD, 9CEX, ADY and OWM saved a boy's life—pendix case. OZM reports EQV made a bug for the YLs at PCU and got some pictures in return. OQO and PSD work for Telephone Co. CEX QRMs BCL with 'phone. Cupid got OZM! KDE puts 1000v at 150 miles on P.P. '10s! MJW, now at Flint, had visit from FBC. MXN reports POC with nice 1.75-mc. rig. CWR is XLN Fishing, Baseball and YLs. DDK reports complete rebuilding. CE has family cares—Gardens, etc. LUU uses 4-stage rig for all bands. HSQ reports 4CWT new in Marquette. HSQ rebuilds. RHM keeps A.A.R.S. schedules, Sunday a.m. ADY keeps his schedule in the Romeo Nut-work. GGF gives three cheers for R.M. PDE. SCEU awaits that W9 call for work from C.C.C. camp in U.P. Conservation Dept. is getting priceless help from the W9's. Any of the gang missing out on it get in touch with 8JO, Emergency Equipt R.M. of Mich., Lansing. MICHIGAN EIGHTS: 8ND is working up schedule with Holland to QSO with folks there. WA keeps his "Detroit News Ham Column" going. FB. JO will mail the "Conservation Dept. Bulletin" to all hams interested in outdoor life—monthly paper and free. Write him. MV schedules HFB at boys' camp. KPL says we're wrong: it WAS a boy—9% lbs! LSU wants O.R.S. GHP has power supply problem licked. LFA reports MCY is ex9GVR. IOR keeps scheduling them. DWB reports several of G.R. gang in N.C.R. QT holds Army call WLTX. LXM reports good results with short calls and wonders why more fellows don't use 'em. HBZ likes O.R.S. parties! AFH operates WNCN on the lakes. QGS had his portable down in Penna. CVF reports experiments with forest-fire-fighting equipment in District 13. ICM is QRL auto-radios. EBX plans c.e. rig. BTP and LFD work together on camp traffic. DCQ is on 7 mc. CM handled message via VQ from Egypt. WANTED: "Crystal icebox. My crystal won't work if room is over 80 degrees."—(sig) EBQ. GUO sends O.R.S. for yearly endorsement. IKZ reports both ops ready to high-ball now. JKO and JCS are brothers. JIU dreams of c.e. JZD reports LTS new in Benton Harbor. LAL works with ELD on Boy Scout camp traffic. EGI signs HCC at

lake. KXT is after schedules again. KOX is over the scarlet fever. FTW says there were about 30 hams at camp, including IHN on 7 mc.

Traffic: W8DVC 233 QT 210 BTP 203 DWB 157 KOX 117 EGX 114 HFB 112 IFD 104 MW 100 GUC 99 FTW 93 LAL 54 IOR 50 GQS 49 HCC 33 ND 31 HA 28 IPX-JZD 25 HBZ 21 CPY 17 DED 16 IFQ 15 KXT 14 DCQ-DSQ 9 JCS-LFA 8 DYH 7 ARR 6 GRN-HFU-IFE 5 AIJ-IXM 3 FWG-FX-GHP-KYS 2 CM-ICM-IKZ-JIU 1. W9AAM 72 ADY 56 PCU 36 DDK 16 KDE 15 CEX 10 CE 8 FKX 30 RHM 6 OQO-OZM 4.

OHIO—SCM, Harry A. Tummmonds, W8BAH—Chief RM W8VP, J. Clayton Nicholson, Cambridge, Ohio. Central Division Convention, Sept. 7th, 8th and 9th, Columbus; see you there. Write Percy D. Jones, 197 East 5th Ave., Columbus, for information. Cleveland amateurs will handle amateur radio at National Air Races, Aug. 31st to Sept. 4th inclusive. Lakewood Radio Club is sponsoring work. S.C.M. BAH will be in charge as in 1929. Dist. No. 7: VP's. R.M., new address: 706 N. 16th St., Cambridge. HMH's new antenna doesn't help valley location. Dist. No. 9: DUV, R.M., reports new hams, MFI and MDU. Dist. No. 5: CJG says two would-be-hams rode bicycles from East Liverpool to visit him. Atq worked Fiji Islands. KLP attended ham outing at Clinton, Pa. BMK is first Ohio O.R.S. to get job as life guard. FGV, R.M., handled long haul relay on 14 mc. Dist. No. 4: UW, R.M., has daily schedule with K6EWQ. IET has lots of schedules. WE reports KNM a visitor. AMF will be at Camp Knox during Aug. Dist. No. 8: R.M. PV. BKE is a newlywed. Congrats. DQC wants a job. BRQ uses 28-mc. 'phone, portable, every week-end. KYQ put up new antenna. Dist. No. 3: APC. Acting R.M. AEW gets all XPDC reports. LCY schedules IET, DVC, KWA, JTT, UW, LZK, 1DG. JMV reports by radio. Dist. No. 2: BKM is cruising on U. S. S. *Wilmington*. N.C.R. EEZ, R.M., will cruise with N.C.R. with INX. ANU sends papers for O.R.S. EJ is rebuilding for N.C.R. schedules. Dist. No. 6: R.M. GSO. JTW is new O.P.S. DZO is moving to new location in Lancaster. EQC reports trunk line circuit: OM2AA, K6JPT, 6FWQ, 9GJQ, 8EQC, 2EZO, K4AAN. FR, OM! IZQ will be pounding brass at Camp Perry. Dist. No. 1: KZL sends first report. BRB does some FB 14-mc. 'phone work. CIO says, "A.A.R.S." FGC schedules HWT daily. RN is still on KFLN. HRA keeps baseball schedules with JCO, Detroit. Club meetings of Cleveland Heights meets every Wed. at FFK, 14522 Superior Road. All hams welcome! BON, R.M., was appointed in charge of operators for Air Race work. GGF reports for Y.M.C.A. Wireless Assn. at Ashtabula. Regular meetings every Wed. night. EJY has commercial ticket. DZV stays up in his plane this hot weather. LAC rewires. HYK spent week-end visiting CPO at Clarion, Pa. At annual election of officers of Y.M.C.A. Wireless Assn.: LKY elected Pres., EJY Vice-Pres., GGF Secy.-Treas., LAC Activities Manager. Visitors always welcome! UW wins state honors and makes HPL. This report rounds out four years for S.C.M. BAH without a miss!!

Traffic: W8VP 82 HMH 4 EQB 14 DUV 4 AQ 18 FGV 9 UW 678 IET 110 WE 27 AMF 4 BKE-DQC 5 AEW 14 LCY 414 DIH 1 LZK 40 JMV 38 BKM 3 ANU 2 ISK 24 JTW 5 BBH 34 EQC 35 IZQ-GSO 3 BAH 4 KZL-BRB 1 CIO 30 FGC 4 HRA 8 FFK 6.

WISCONSIN—Acting SCM, Carl F. Thoms, W9LFFK—Acting SCM's 9ATO and LEK. ATO has new rack. RKP handled traffic for astronomers. LRB works schedules from Y.M.C.A. camp. SDK is new Hancock station. JNU likes Collins antenna system. OXP qualified for O.R.S. KJR worked VK, ZL, CM, X, PY and VP. PQU is looking for schedules. NSM blew filter condensers. LEK's neighbor's d.c. fan causes QRNN from 1.7 to 30 mc. OUF moved to Burlington. GVL works Europe regularly on 14 mc. OUT has new antenna. PTE scheduled GTP of W.N.G. Camp Williams.

Traffic: W9ATO 154 IQW 54 RKP 57 LRB 50 PTE 49 SDK 31 JNU 28 OXP 26 KJR 22 ETM 24 PQU 17 NSM 16 OUT 8 GVL 3 LFK 12.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Fred J. Wells, W9JVP—KBE uses Goyder Lock. PGO joined C.C.C. JZJ works 14 and 3.5 mc. PDC has Powertone receiver. LHS is putting in Collins coupler. FVV will have 1.7-mc. 'phone. PSF has new Class "C." OEL has 50-watt in final. EHK is putting in high power. RPD has new power supply. PVA visited S.C.M. SAW uses '71s P.P. BTJ has new RK20. MZE is working on new 'phone. HJC ordered new RK20. AVT will be on 1.7-mc. 'phone. PRU reports by radio. AOX is getting ready for 3.5-mc. traffic. RQX has new M.O.P.A. DGS reports J.R.R.C. is being reorganized. New hams: SGN, RYU, SEQ. QRL work: OSN, PQW, JAR, EFN.

Traffic: W9KBE 73 PGO 21 JZJ 18 PDC 13 LHS 12 FVV 6 PSF 3 OEL 14 PQW 16 EHK 1 NAW 3 PVA 1 SAW 7 PRU 1 JVP 32 DGS 10 EFN 2.

SOUTH DAKOTA—SCM, Mike Strahon, W9PFI—IQZ reported by radio for Pierre gang. PFI has 212D. RYU and SEB are new Pierre hams. OXC moved to basement. GRJ got new ops ticket. CFU is putting up new Hertz. GYG is building new receiver. FLO went fishing. DGR is vacationing in Yellowstone Natl. Park. IQD is spending month in east. PHD is rebuilding. Ex9CKT reports ten Parkston hams active on 56 mc. TY reports SCB new YL ham at Vayland. SCB visited Black Hills and saw stratosphere balloon. SGI is new call in S.D. GPB moved to Sioux City. OED visited TY and SCB. Miller Radio Club organized with ten members. DNS will have RK20 final.

Traffic: W9IQZ 10 PFI 1.

NORTHERN MINNESOTA—SCM, Robert C. Harshberger, W9JIE—6GTM visited LAY for two weeks. FEP is putting in windmill battery charger.

Traffic: W9LAY 1 OMI 1 PUB 25 HNS 4 JIE 42 IPN 20.

SOUTHERN MINNESOTA—SCM, Francis C. Kramer, W9DEI—HCC finds traffic on 7 mc. DEI lost antenna by lightning. FCS will attend radio school. RHT is working for O.R.S. MOW is our first O.P.S. GNU has new super. PDL blew filter Friday the 13th. BTZ put in 800. RAB may get job in Bolivia. BN keeps four schedules. DH hopes to have 'phone on soon. AIR is home after operating on river. FYA is back to radio after trying commercial art. EGG's antenna blew down. MXW will be on with 500 watts. FIL is proud father of a baby YL. Congrats. PJU uses P.P. '45s final. JEQ is building 3.9-mc. 'phone. PEV heard a 28-mc. signal. GIE concentrates on 56 mc. FNN uses '03A final in portable. BTW worked seven Asiatic stations in month. DCM and MZN gave up their bachelor standings. FWN schedules N.G. camp. KDI attended N.G. camp. DMA worked lots of 14-mc. DX. OAK works in cannery. ELA worked all continents. ADQ uses 28-mc. 'phone. GXV of Hiawatha, Kans., is at hospital in Rochester. MOV is prospective O.R.S. PAS has flea-power 1.7-mc. 'phone. MMO coaches two new hams. RBW has new YL and bug. Club News: Fairbault Club moved into new club rooms. St. Paul—Minneapolis clubs had lots of 56-mc. activities at their picnic. Rochester Club has big interest in 56-mc. The S.M.R.A. recently held a well-attended Field Day in Rochester.

Traffic: W9HCC 90 DEI 61 FCS 29 RHT 27 MOW 17 GNU 8 PDL 6 RKG-BTZ 4 BNN 3 RAB-GUX 2 BN 1.

DELTA DIVISION

ARKANSAS—SCM, H. E. Vette, W5ABI—CPV has portable at Hot Springs. EEJ built shack. DVJ handled traffic for carnival. BED was chief op at DVJ during carnival. DRY and DRW handled carnival traffic. UI has '47-'47-'10 combination. DZE has c.e. rig with '10 final. LH moved to L.R. AQD is W.A.C. FB is back at Hazen. CJM enforces the law. QI is building c.e. rig. EIP is new O.R.S. VZ and AMQ operate for HQ Co. C.C.C. L.R. EIJ sends first report. EGY is new call of Ex-4AJJ. DFY will trade sax. for FBXA. CZG is confined to bed. DVI uses remote control. DHU took part in important message relay from coast to coast. DWL is

going to C.M.T.C. camp. ARX wants Ark. on top. DYX has FB 50-watt panel job. DTI has been in Scout Camp. DRR is Ex-BUX. DGO and DGD sold out. DJQ and BZK are on 3.9-mc. 'phone. DHG is on 28 mc. DHH is coming on c.e. DGU will be on from C.C.C. camp. CPV, FK, BED, and ABL paid the S.C.M. a visit. A Radio Club has been organized in Little Rock with BMI as president and DFY as secy.-treas. We are glad to note that with each issue of the Arkansas Bull., our reports are increasing. For your copy be sure to send in monthly reports.

Traffic: W5CVO 104 DVJ 671 BED 14 DRY 280 DRW 213 AQD 12 ABL 6 EIP 12 BMI 97 DVI 23 DHU 7 ARX 123 DTI 5 DUV 56 DRR 17 DHG 3 DSW 7.

LOUISIANA—SCM, W. J. Wilkinson, Jr., W5DWW—BYV will visit in Florida. DPM worked VK using '45s. BSM is active in Covington. EBZ is on 7256 and 7167 kcs. CEK is located in Opelousas. DWF is building new c.w. rig. AMZ has Collins 32B. CIT is on 7192 kcs. CJO is visiting on Gulf Coast. EDZ was at World's Fair. AFH has fine freq. meter. DIQ broke his crystal. DMF is building Tri-tet. DES is remodeling for 14-mc. 'phone. BPN is working on 1 KW job. ST likes rag-chewing. LA has rig for all bands. AOZ has antenna trouble. CXQ has rig in parlor. GR is installing c.e. EDY schedules 9KOA. BI is 100% c.w. man. JW likes SW3. DKR is working hard as R.M. AGM likes experimenting. EAI is on 1935-ke. 'phone. EHB: Welcome to our midst. OZ is on fruit boat. AVO is on a tanker. ACV is on freighter. IN is busy with music. DAW sends regards from X1BK. MH is on 3.5-mc. 'phone. EGV is Ex-6ETH. AXU is on 3.9- and 14-mc. 'phones. BZR will build Tri-tet. CMQ keeps traffic schedules. BPL installed temp. control. HR works 56 mc. with DXK. Last announcement—Louisiana State Convention—Shreveport—Sept. 1st-2d—Headquarters, New Inn Hotel. We can use some O.R.S., O.P.S., O.B.S., and O.O. Let the S.C.M. hear from you. DXL and EKG are new in Monroe. BID is in La.-Miss. 'Phone Net, A.A.R.S. AKW is op at KTBS. CTR took Class A exam. DLD ordered new receiver. CQF wants job as E.E. ZV is the YF at CQF. AQC will have new rig soon. NM and ACA are at sea. BMM steps out on 14 mc. AYA has Jr. op. MH and AKT are active in 'Phone Net. VT, BZR and AQC journeyed to N.O., July 4. Active: DYR, AYZ, CEN, CWX, AJJ.

Traffic: W5BYY 15 CEK 4 KC 10 DKR 7 MH 2 AXU 5 BZR 62 CMQ 42 BPL 4 HR 14 BID 23 CTR 7 DLD 4.

MISSISSIPPI—Acting SCM, W. P. Allen, W5VJ—CWQ visited 4PL for a week. DEJ was operated at Boy Scout Camp Binachi with pair of '01As with 270 volts B batts on plates. DDL is on with 59 c.e. GQ changed to 59's parallel in output. AKP is on in Booneville. EBF attends N.G. camp. DXG works 7-mc. DX. CUU is active on 3.9-mc. 'phone. (Most of this report furnished by 5CWQ.)

Traffic: W5DEJ 143 CWQ 119.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Robert E. Haight, W2LU—BZZ is organizing N.Y.S. Traffic Net. EGF FB total with FB skeds. LU is on 3630 kcs. BJX reports for M.-H.A.R.C. FQG is new O.R.S. KI schedules 1AMG, 1HAG and 2FDQ. GTC visited BZZ. BJA handled traffic for EZJ, Camp Smith. GRY operates EGE, White Plains. CC totals 800 schedules with VK5HG1 UL is after Class A ticket. GGQ schedules CMI and BYL. FCT worked CT1GU with 4.08 watts input. ESO lost power equipment. GNI reports new Ossining ham, HFG. ACY is DX King of Schdt'y. CJS plans visit to A.R.R.L. ACA is on 14,332 kcs. DC on 'phone, handled traffic from WIOXDA and LU8DR. DSH has 30 watts output. BLL spent vacation experimenting. FXC worked 39 foreigners in 22 days. HJN is new ham. GTW reports 8MFU, new call, Matamoras, Pa. GPB is using portable at Alton Bay, N. H. QY is on 56 mc. DTB captures W.A.C. ACD is on 14 mc. DVS contacts Germany. BTQ does FB work at EZJ, Camp Smith. FPP contacts S.C.M. DYC and 8AW, Detroit,

visited 2LU. GWY has RK-20 last stage. DDW contacts S.C.M. with club's new transmitter. BXH is new member, M-H.A.R.C. CVT, BCO, BNR, GFD, and DPN are active on 56 mc. COY is on active duty with NCR; trip to Cuba. DWO is working at N.B.C., Radio City. CGT uses pair '10s P.P. final. BWG moves to Kingston. BSH enjoys vacation in N. J. BPH's shack gets HOT (140 degrees)! CL works VK5HG using RK20.

Traffic: W2BZZ 575 EGF 384 LU 325 BJX 233 BLU 213 FQG 102 KI 108 GTC 80 BJA 73 GRY 24 CC 13 UL 8 ATM 6 GAR 5 GGQ 3 FCT 4 ESO 3 GNI-ACY 2 CJS 3 ACA-DC 2 DSH 1.

NEW YORK CITY AND LONG ISLAND—SCM, E. L. Baunach, W2AZV—ELK BPLs for seventh month. EYQ is trying new antenna. DJP has c.c. rig built by DUP. PF will be on with 500 w. rig. GDF visited 9USA. GOW reports HFS on 14-mc. 'phone. EQL worked first VK. CSO has '52s F.A. FIP has second-class commercial ticket. ECL is building super. FDQ blew '66s. EGA uses single 27 in transmitter. AZV uses Tri-tet. DUP attends a machine shop class. EVA reports AKM gets into Conn. R9 on 1.7 mc. US is busy with RK20. DWW is on 56 mc. ALD moved to N. J. EAR will use portable on vacation. BTF rebuilding ready in fall. HBO sends first report. CHK finished 14-mc. rig; reactivated a W.E. 21IE. CEH is improving rig. DBE is back in Babylon. EQA is in the market for a receiver. BEF is waiting to QSO an Asian for W.A.C. EWS landed job aboard ship. EKD is at Long Beach for summer. HFG is on 3580 kc. GOV will soon be on 3.9-mc. 'phone. The heat has BAS. CYA is now a resident of Washington, D. C. GZR is on 7 mc. GPR reports at end of school term at Stuyvesant H. S.; there were 15 licensed operators; CPP, ETG and EZS graduated. CBB has temporary Hartley rig going for 9USA traffic. AHC, AZS, DUA, DXO, EAR, GLJ, KI are all out for O.R.S. GEI thanks CAC for fine work in helping him get on the air. BHL is on 56- and 23-mc. 'phone. AA has a complete log of all commercial stations as he listens on 600 regularly. AAZ is back in silk business.

Traffic: W2ELK 593 EYQ 291 AYJ 195 GLJ 105 DJP 53 PF-GDF 27 GOW 39 EYS 20 EQL 17 CSO-EAF 16 FIP 15 ECL 19 FDQ 90 EGA 12 AZV 40 AEN 11 FF 10 DUP-EVA 5 DOG 2 DWW 1 BTF 3 HBO-CHK 2 AA 6 GZ 2 LB 12 ADW 8.

NORTHERN NEW JERSEY—SCM, J. B. Rideg, Jr., W2EKM—The new SCM wishes to thank all those who supported him in the election. BCX is new R.M. Following make BPL: LK with BCX opr. and EKM. The Bloomfield Radio Club is on 3.5 mc. with pair '52s. Meetings are held every Wednesday. GGW is experimenting on 7 mc. HFO is rebuilding c.c. rig on 14 mc. DEN worked his first foreigner, PY9AH. FRC is chief op aboard U.S.S. Tucker at Fort Hancock, with the Sea Scouts. TP and AOG are still huzzing on 14 mc. AFK, DLF, DVN are rebuilding. FOP is assistant director of Boy Scout Camp in Glens Falls. CLM is on 7 mc. daily for rag chews. BSC handles traffic from Steven's Engineering Camp, Johnsonburg, N. J. DEE and CIM are seen floating through space on highways looking for waterholes. CW keeps active on 7 mc. ECO reports new ham in Jersey City, HFZ. GPH is active on 56 mc. The West Essex Club is getting their transmitter ready. ENZ is opr. on a vessel going to South America. ECO and DCP request O.R.S. CTT is getting c.c. job on the air. CLM built midget transmitter, 4 x 4 x 5. HI! FLT continues summer schedules. GGE is rebuilding to Tri-tet. BXM was on two weeks' training at Camp Dix. GCV rebuilt transmitter. CIZ's license expired. HDA reports for first time. HDU is new ham, using an '01A. ETC was heard in Germany. CKM expects to sail for Egypt. EDK holds code practice nightly 8 to 8:15 p.m. on 1.75 mc. GPA reports for active stations in his locality.

Traffic: W2EKM 2258 LK (BCX opr.) 772 CGG 74 GGW 46 DEN 11 JC 10 ENZ 479 ECO 60 DCP 27 CTT 21 CJX 18 CLM 7 FLT 4 GGE 7 BXM 1 GAS 25 HDU 2.

MIDWEST DIVISION

IOWA—SCM, Phil D. Boardman, W9LEZ—Chief I.R.M., 9ABE; R.M.'s: 9CWG, 9HCH, 9HPA, 9HMM. Iowa-Illinois Amateur Radio Club held successful hamfest at Burlington. The Section needs O.B.S. and O.O. in west and central part of state; those interested and qualified please write R.M. 9CWG. Don't forget the All-Iowa QSO party. RDK leads Section. NTW received Class A ticket. HCH visited Director Kerr. ABE summers on 7 mc. CWG hasn't missed a hamfest yet. LEZ has new s.s. super. FZO converted YL into OW. HMM was appointed O.B.S. NZW was on vacation. NDN bought new bug. RCR finds swapping not so hot. DFZ is adding pair of '52s. CYL conducted successful ground to plane test. LFF has good schedules. NEC would like some reliable schedules.

Traffic: W9RDK 55 NTW 45 HCH 44 ABE 41 CWG 29 LEZ 27 FZO 12 HMM 11 NZW 10 NDN 8 RCR 3 FYC 2 NEC 6.

KANSAS—SCM, O. J. Spetter, W9FLG—MUY has 825 final. IQI is preparing for N. G. camp. PB is getting N.C.R. net going. LUV plans on moving to Sanitarium at Morton. RIZ is new Agra ham. LGV uses Collins system. RQE and PB are active Hiawatha hams. GXV went to Rochester, Minn., for treatment. OQC visited in Colorado.

Traffic: W9MUY 50 IQI 23 PB 15 COA 11.

MISSOURI—SCM, C. R. Cannady, W9EYG—JWI and MZD get State Net under way—want more men on it. MZD is trying to get CJR, HUG, AIJ, ENF, NNZ and ASV to join State Net. OLC worked all ZL districts one A.M. NNZ gets new Silver 5B s.s. DIO was visited by NNZ; visited SGP. MLR is only ham left at Boonville during summer. DHN is on 28 mc. ARH changed QRA back to Milan. AAN changed QRA to Richland. HNM is back at Browning on portable. IAC is rebuilding. CGA is consistent on 14-mc. 'phone. PBZ got new SW-3. MND lost antenna. OUW moved to 3.5-mc. c.w. NIS is scoutmaster. JXJ built regenerative type s.s. super. BLV has new c.c. rig. BWX stays active on 3.5 mc. LCG put in hi-voltage supply and antenna impedance matching system. An FB Hamfest at Marceline, July 4th, with 22 present, including: KG, FEV, AIJ, JBV, JBZ, X9JTH, LBA, RTG, DIC, KOI, KCG, NNZ, etc. This is an annual affair and grows larger each year!

Traffic: W9JWI 2269 MZD 257 OLC 44 CRM 43 LLW 42 NNZ 40 AIJ 38 JPA 4 LBB 8 BMA 6 DPJ 14 DIC 11 MLR 2 RPC 6 DHN 3 HVC 1 KEF-ARH-KVN 2 HUG 4 AAN 7 LJW 11 JAP 5.

NEBRASKA—SCM, S. C. Wallace, W9FAM—FWW is doing FB traffic work. DI took cruise on Great Lakes. FAM is on 3.5 mc. Sunday mornings only. FXP's business is rushing. JED expects to move to Wayne, Nebr. DGL is still DXing.

Traffic: W9FWW 224 DI 3 FAM 2 OPP 1 KVZ 56 RUJ 118 DLK 30 DHO 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Frederick Ells, Jr., W1CTI—MK is only station to make BPL. DOW hangs on to the banner. UE took a week's vacation. CVL is active in A.A.R.S. GC has been on 56 mc. GKM has some new schedules. AMG's shack is an oven these hot days. BDI is working with an RK20. CJD reports by radio traffic handled with portable. HLE was on island two weeks, depending on portable for communications. EWD reports new ham, IDX. ATW visited HQ's. TD gets good reports. 56 mc. shows big increase at BNP. CBA continues meeting every Thursday evening. Recent visitors at the club were: S.M.B. and the New Canaan Amateur Radio Club, FLA. BIC is new O.P.S. EFW at FEF worked Hdq. in N. H. May 27th . . . 100 mile 56 mc. record. Get in touch with CJD or CTI if interested in Conn. Traffic Net.

Traffic: W1MK 483 DOW 332 UE 107 CVL 95 GC 76 GKM 51 HAG 26 AMG 158 GGX 13 BDI CJD 15 GME-QV 13 HLE 12 HSU 5 DGG 6 CTI 3 EWD 2 DFT 49 HTH 4 ATW 6.

MAINE—SCM, John W. Singleton, W1CDX—BTG uses 1.7-mc. 'phone. CDX is DXing on 14 mc. GKC has new Colpitts rig. DHH's antenna was hit by lightning. EEFY is traffic manager of "73" Radio Club. AQW is QRL Bates. HUX is building e.c. rig. IDN has lots of fun with 56-me. rig. ALO is active on 56 mc. HXO has a Harvey transceiver. 1FT is new Wilton ham. FXA is new O.R.S. FJP blew bunch of good apparatus. 1AF and IBM are new Augusta hams. GBM and EBM are running a concession at Skowhegan, Bangor and Lewiston fairs.

Traffic: W1BTG 59 GOJ 17 CDX 41 GKC 12 CBU-DHH 11 BNC 4 EEFY 7 AQW-IBM-HUX-IDN 1.

EASTERN MASSACHUSETTS—SCM, Joseph A. Mullen, W1ASI—ASI and CNA are on 56 mc. with portables. ABG and BZQ are on 56 and 3.5 mc. KH claims first legal QSO between moving auto and plane. EVJ is QRL orchestra work. BMW is QRL summertime business. RE works on 1.7 mc. Hot weather doesn't bother FRO's traffic total. GCL reports heavy damage to outfit from lightning. ZK is QRL Signal Unit at Fort Devens. DOF reports heavy damage to power supply. BR is O.P.S. Nr. 13. HKY is building Tri-tet. AZF is DXing. FPO will be our next O.R.S. ACD works portable at Lonesome Lake. N. H. IDU just got ticket. CEL works 56-mc. schedule with DBM. AC is "movie on." JT is brass pounding in China. AAX will have RK18 final. BUR works DX. BCM is QRL RK 20. CZP plays with low power. CMH and HNI use M.O.P.A. on 3.5 mc. DZL and DND formed partnership. DDO is eating fruit instead of c.w. Hi. EKH has '03A rig. GEJ is fooling with TNT '10 on 7 mc. FKX and UI are on 56 mc.

Traffic: W1ABG 37 KH 67 EVJ 24 BMW 1 RE 3 BZO 4 FRO 145 CRA 27 HKY 1 BZQ 24 FPO 35 ACD 9 CEL 72.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—Thanks, gang. Will do my best. ASY (the former SCM) wishes to thank all those who assisted him during 1933-34. EFM has new Silver 5B super. GHU blew power pack. New equipment: BNL—and RK 20; COI—59 Tri-tet; DVW—SW3. ZB is experimenting on 23 mc. AJD had schedule with Fort Devens. FNY lost antenna and chimney in storm. BVR maintains A.A.R.S. schedules daily. *Please note:* monthly reports are expected from every O.R.S., O.P.S., R.M., O.B.S., and O.O. Failure to do this will mean cancellation of appointment. In cases where interest no longer exists, send in your appointment, out of fairness to the rest of the gang. Let's go, boys!

Traffic: W1BVR 207 FAX-EFM 16 GHU 11 ARH-AWW 9 GUO 6 BNL-DUZ 4 COI-DVW-ZB 2 AJD-10K 1.

NEW HAMPSHIRE—SCM, Basil Cutting, W1APK—The SCM visited FUR, owned by Prof. Pickard; he has a wonderful outfit at Seabrook Beach. BAB is getting active again. AGO has dynamite mike. HQE is going to camp with a 19 transceiver. HTO has new rack. GHT is good traffic station. The Jinx around FFZ has departed. HJI is climbing local hills for 56 mc. UN handles most consistent traffic of any N. H. station. CUN was heard in Russia on 3.5 mc. and received his W.A.C. GEY has Class A license. Summer business keeps FCI busy. DMD is busy with N.C.R. AUY had some fun with QK's oscilloscope. AXL is on 1.7-mc. 'phone. ERQ did not join Navy as reported. 2EOY ht-1 is on 1.7 mc. in Bradford. N. H. GKE works in transformer factory. ANS and IDY are new O.P.S. The SCM is on 1807-ke. 'phone. FFL sends last-minute report.

Traffic: W1UN 148 ERQ 63 FFZ 124 HJI 6 GHT 53 APK 9 GEY 2.

RHODE ISLAND—SCM, Albert J. King, W1QR—GNT reports ducks doing FB. CPV has '52 final. ASZ was hurt in auto accident. GOG has portable at Sheldronville. HRC has been assigned WLKG in A.A.R.S. CAB is rebuilding. FAA moved to Pittsfield. IEG is GTN's offspring.

Traffic: W1CAB 68 CPV 55 HRC 32 GOG 22 ASZ-QR 10.

VERMONT—SCM, Harry Page, W1ATF—ATF received visits from BD and BJP. GAE is arranging schedules with Hudson Valley amateurs. GXP (Derby Line) reports for first time. GNF applies for O.R.S. FPS has new Ford V8. Friday, July 13th, lightning struck and demolished CGV's 65-ft. tower on Hook Mt.; he won a 6000-volt transmitting condenser at Perth Amboy, N. J., Hamfest on June 16th. FMQ, Acting Secy. of Twin State Radio Club, reports 20 members active, a club building completed, and a 500-watt transmitter ready for action. EMQ, 1DQ, DEZ, and AAK represented the club at Kennebunk Hamfest. DEZ won a first-class meter.

Traffic: W1GNF 23 GAE 11 GXP 5 ATF 3.

NORTHWESTERN DIVISION

ALASKA—SCM, Richard J. Fox, K7PQ—ENA, ENP and ENZ; new hams at Ketchikan. DGR complains that high frequency gets erratic at 35 to 75 below zero. CAN reports 14 mc. excellent for east coast work. BNW reports visit from W7CPI. DJA has new steel transmitter frame. EBR is QRL commercial work. CF craves a 3.9-mc. 'phone crystal. AOC puts out a wicked signal on 3549 kc. PQ schedules W1CVF bt 7 at Lake Crillon daily. BEU is on the air from Guard Island Light.

Traffic: K7GCK 112 PQ 78 CHP 50 EBR 25 CAN 14 VH 13 DJA 12 BNW 10.

IDAHO—SCM, Don Oberbillig, W7AVP—BDX sends FB report from Northern Idaho. Thanks, Doug. DCG has been working DX. EKK has new Gross transmitter. EKV is building portable. AQK is vacationing in hills. BLW is visiting in Kansas. CLY is QRL blister rust work. BQF has lots of service work. BKK has new PR10. DBP attended hamfest at Spokane with DKY. DDU's new QRA: Caldwell. CMD is on 3.9-mc. 'phone. CGR has rebuilding bug. BAA is boosting hamfest at Jenny Lake. BMF is grinding crystals. DSL is at C.C.C. station. BRU and ASA are new O.R.S. NH says it's warm in Twin Falls. AAJ visited S.C.M. DAY is traveling with AAJ. DCM dropped in to see boys in Boise. BAR bought new home. DAW wishes QST would suspend for year so he could catch up on his building. HI. CZO goes BCL with new car receiver. CSP is talking fishing trips. KI and DMT are busy at N. G. Armory in Caldwell. ACP sold his Ford. CP and EES are rebuilding KIDO to 2½ KW. CKO is going on vacation with portable. ABK gets lots of QSL cards. DZO and AVP have "hot" QSOs. ATN is staying home nights and "hamming." BCU wants new receiver. CG is QRL maps. EFR needs a W2 for all U. S. contacts. EMT has rig built on glass subpanel.

Traffic: W7AVP 169 NH 35 BAA 18 BMF 12 BRU 5 DBP 4 DAW 2.

MONTANA—SCM, O. W. Viers, W7AAT—Anaconda: EIB, EIH, EJJ and FOX: new hams. AHU is now e.c. CUK and DST are QRL C.C.C. Anaconda Amateur Radio Club has applied for station license. AFU and EET work ZL and VK. Missoula: CCR is on Breakfast Club. CNE favors 56 mc. BVI's O3As take 2000 volts. ASB has bias trouble. BZA schedules EAQ who left for L.A. AQN has new Ford V-8, CIX, 6APM, 7BZA, ASB and CNE are victims of YL-itis. CRU is U.S.F.S. Radio Supervisor. Missoula Radio Operators Club: CRU Pres., CNE Vice-Pres., AOD Secy.-Treas. CRH of Somers is operating WUBL, C.C.C. station at Fort Missoula. BGM, AQN, 6APM also operate WUBL. AOD schedules 6ZG/WLV Monday PMs. BGM has new first-class radio-telephone license. DHW says DX is FB. ASQ and EEH are rebuilding. FL has gone to Seattle to begin a cruise with N.C.R. FVE, now at Fort Peck, applied for O.R.S. endorsement. BYR plans to go to school in Calif. AAT/COX are now permanently located at Missoula. Please send reports to the S.C.M. at 211 Stevens St., Missoula.

Traffic: W7CCR-AAT 6 CRH 11 FL 4 AOD 19 EET 20.

OREGON—SCM, Ray Cummins, W7ABZ—DAV is now A.A.R.S. ANV applies for O.P.S. CHB is vacationing at Seaside. DHZ has hard luck with 56 mc. DKI is with EJY at C.C.C. camp. CIK's new e.c. rig sure works

the DX. BHV returned from Notre Dame. DBZ built 4-tube super. RE returns to air after long absence. DYK has new Collins transmitter. WL has new antenna poles. BUF schedules ZL's on 'phone. AYW will soon have kw going. BUB is in Medford C.C.C. camp. BMN is rebuilding 14-mc. 'phone. BWD is vacationing in Calif. EJO owns drugstore in Portland. CBD contacts ZL's and VK's with ease with new rig. AIG is rebuilding. DNP is vacationing. MF is now WLVO, A.S.N.C., A.A.R.S. DDG is new O.P.S. ABZ has gone 'phone for good. Oregon welcomes a new S.C.M. in W7AMF, Frank Black, and all reports are to be sent to him. I have fully enjoyed serving the amateurs of this great state of Oregon, and will miss the friendly contacts that one gets in the S.C.M.'s office. 73—W7ABZ.

Traffic: W7DAV 1 DP 13 WR 30 DHZ-DKI 1 EJY 8 CJK 78 BHV 1 WL 6 AYW 52 BUB 45 BMN 7 EJO 22 CBD 12 COU 34 MF 141.

WASHINGTON—SCM, Stanley J. Belliveau, W7AYO —APS says mostly ragchewing this month. RL has good schedules. Forty mfd. of 3000-volt cond. in AVM's power supply. ECX is troubled with power line noise. BBK reports gang around Ritzville had swell picnic at Sprague Lake. New junior op. at QI.—Congrats. AEA is back in traffic swim. CQI is 100% c.w. DET plans to take portable to college. AWJ gets out well. DRK took Class "A" exam. CZY has been in Hawaii. IG is berry picking in Puuvalup. DRY has nice schedule line-up. AZI is going on N.C.R. cruise to W6. BBB handles lot of K7 traffic. LD was away from home this month. DZX is going back to Anacortes. ACS (ex-SCM) has been doing research work on 56 mc. BRT is new reporter. DGX has been visiting hams in Northwest. CPK schedules K7AOA daily. AW has nice sounding 'phone. CAM works out nicely with 'phone. AGP is playing with 56 mc. APR reports for first time in ages. BUW is working hard on ranch. ALH is moving to Yakima.

Traffic: W7QI 289 BBB 249 CQI 183 CPK 112 DRD 86 DRY 84 DJJ 37 DET 34 APS 27 CAM 17 AW 16 DGX 15 AGP-BBY-AEA 12 AWJ-RL-BBK 10 BRT 8 AZI 5 ECX-DRK-CZY-AQ 4 BUX 3 AVM-DZX-AUP 2 NZ-APR 1 BUW 12 WY 9 ALH 41.

PACIFIC DIVISION

HAWAII—SCM, A. O. Adams, K6EWQ—BAZ schedules 9USA on 14-mc. 'phone. YAL schedules VE5ER on 3.5-mc. 'phone. CIB and VG are rebuilding. HFI/ECN is doing nice work with new rig. CRT left for Coast. HOO expects his orders any day. GUA says, "nothing like P.P. '60s." HLP finally mastered "bug-sending." FUF is new O.P.S. JFV finds it hard to work with one arm. CRU claims to have the worst location in the Islands. FAB keeps several schedules. Welcome to our Isles, IID.

Traffic: K6EWQ 3286 GUA 333 KKA 282 FAB 183 KTF 124 GZI 102 JPT 75 COG 57 JFJ-HOO 20 CGK 15 CRU 12 JFV 13 EDH 5.

LOS ANGELES—SCM, Howell C. Brown, W6BPU—This report prepared by Edward P. Strople, W6AUB. AZU handles transpacific traffic exclusively. IIK hears S's, 7's and 6's on 28 mc. ERT is working 56 mc. ETJ schedules WVQB, Schofield Barracks, T.H. AUB is op at BPU for summer. JDZ is at Boy Scout camp. IUL handles traffic from Scout camp. IOX needs Africa for W.A.C. AM uses directional antennas. HDV has PR10 with pre-selector. DEP passed Class A. FGT is installing U.S.N.R. station in City Hall. EQW was at Lake Arrowhead for July. EK is Alt. D.N.C.S. 10th Calif. A.A.R.S. EUV is working 56 mc. IHA has new rig. JWL has 830 in final. LY is oping on 28 mc. ANN worked G2KK, but thinks it's a fake. FVD reports by long distance 'phone. BPM thinks traffic on 'phone FB. CVV was QSO G6HP on 28 mc. PD had an hour QSO three-way: FXL, PD, VK3KX. 5CON paid IDW a visit. KEY is going 50-watter. ON says Collins antenna network FB. CUH/QD "WAC" R9 and "WAC" 4 1/2 hrs. July 14th. IFC says KWZ is new ham there. KJE's brother got call KZI. BVZ is back from fine vacation. BQF says bad power leaks take joy out of life. HPE uses pair of tens. CV

has new Le Bell rack. DZI says shield can business slow. BGF has new rig on way. ZBJ is QRL Y.M.C.A. camp. CYS got 85 in commercial telegraph second. FET is playing tennis to reduce.

Traffic: W6ETL 1047 AZU 891 IIK 502 BMC 433 EDW 336 HZT 289 ERT 273 ETJ 216 BPU 100 EBK 150 JDZ 134 IDZ 118 IUL 102 GNM 95 IOX 78 AM-FIC 69 BZF 66 HDV 60 CGE 57 DEP 44 KRY 43 FGT 37 HJW 36 DJS-HDC-AKW 32 HID-EQW 30 FYW-GEX 27 JQS 26 KNP 24 DNA 22 EK 19 EUV-IHA 18 HFG 16 GLZ-JWL 15 JSK-JWY 14 KRI-FXF 12 KCG 11 FUS-KEI 9 LY-EGJ 8 GTE-JFS 7 IBS-GSL-ANN 6 FVD-TN-BPM-IDU 5 KBF-CVV-FJK-DYQ-AGF 4 JXZ-IVT-JEV-PD-IDW-KEY-IVU 3 GVI-IRD-HHG-ON-BOB-CUH/QD-AMF-IFC-KJE 2 HRO-JHC-IRT-DZR-BVZ-BQF-GJA-VO 1.

SANTA CLARA VALLEY—Acting SCM, Barton A. Wood, W6DBB—DBB put up single-wire fed hertz. HCQ schedules L.A. and San Jose. IED worked all continents with a '10. CUZ worked G, ON, F8, D4, PA, OA during last month. BMW is fighting forest fires. GBI uses unity-coupled rig. FYD has c.c. transmitter. HZW is rebuilding to higher power. HJF has '03A final. 56-mc. activity is exciting considerable interest. JDV has made two-way contacts with BPL, CEO, DUW, DZE, EEX, FZF, HC, KPR; heard HBB and was heard by AOF. Successful communication between San Jose and Mt. Hamilton was also accomplished.

Traffic: W6DBB 49 HCQ 38 IED 26 CUZ 16 BMW 14 JUO 1.

FAST BAY—SCM, P. W. Dann, W6ZX—RJ got emergency equipment ready for strike area. EJA is handling P.I. traffic. ZX contacts east coast and 9ISG nightly. HWB of Richmond reported. DHS was called to active duty with C.N.G. FS had FB time at A.A.R.S. Hamfest at Yosemite. HRN gives the S.C.M. following dope: HRG is on 14 mc. IEW is on 14-mc. 'phone. FKQ's 50-watter went flat. ATJ is going to L.A. on vacation. FJQ has plenty of grief. GXM, star traffic hound from L.A., was visitor at S.C.M.'s, as well as COJ from Hughson. AHI is just home from Orient. GXQ is going to work again! CHI of Palm Springs is on in Oakland. HRT is going to get Class A soon. BLQ is on 1.7-mc. 'phone. Gordon Anderson (Call please, OM) reports FB reception at Yosemite. KNO says IGA and AOJ visited him. KNO and HHM are new O.R.S. CTX spent a week or so with the mer(e)maids around Catalina. Hi! Cl, a real O.T., is on the air again. GHD has turned to 'phone on 1.7 mc. ITH is busy on Bay Bridge.

Traffic: W6RJ 240 EJA 113 CIZ 52 ZX 34 HWB 12 DHS 7 FS 16 AHI 2 HRN 6.

SAN FRANCISCO—Acting SCM, Art Holmes, W6JAL—S.C.M. is working out of town. Summer hasn't slowed up ZG! RH is coasting with five schedules. HRY almost catches RH. FVJ and CIS keep two schedules. DDO helped National Guard. HSA is worried about note. JPA quit skeds for summer. KNQ is new traffic man. Our greatest sympathy and regret to 6JMR in loss of his father. JNI is Unit Control in Petaluma. HZP has new '66s. BNA is recovering from operation. JQV is expecting fifty. JDG has one schedule. JZJ is U.S.N.R. man in Inverness. CAL worked four districts on 28 mc. JQZ is working again. KBM is active again.

Traffic: W6ZG 1754 RH 117 HRY 108 FVJ 74 DDO 45 CIS 34 HSA 27 JPA 22 JAL 19 KNQ-JMR 18 JNI 17 HZP 16 BNA 15 JQV-JDG 14 JZJ 4 CAL-KBM 3 JQZ 2.

SACRAMENTO VALLEY—SCM, George I. Woodington, W6DVE—DVE used portable rig on vacation. CMA sent good report on A.A.R.S. activities. CXB, CBZ and KKL are on 1.7-mc. 'phone. KME is new call. IMJ is going to Tri-tet. KCA is c.c. IMV builds transformers. EOU is going to N. G. camp. GDB is N. G. station. GVM is going to C.C.C. camp. KKB is pounding brass for commercials. GAC is doing fine in his new store in Georgetown.

Traffic: W6EVB 55 GAC 29 CGJ 12 IZE 8 DVE 4 KCA 3 GZY 1.

ARIZONA—SCM, Erneso Mendoza, W6BJF-QC—

ALU is preparing for Flagstaff N. G. encampment. IIG worked his first Cuban. QC reports from Camp Mocur at Parker. KOL is on 3.5 mc. with '45-'46 MOPA. FIP says Army will furnish him Comet pro! HCX is trying Collins coupling. ISO uses Goyder lock system. KSE is new Phoenix ham. IOG is rebuilding to c.c. IJR needs only Africa for W.A.C. FOH is in Miami. CQF has 12-watt 'phone on 14 mc. ABY has new RK20. FGG is vacationing on Pacific coast. BQW took Class A exsm. IJO is joining Navy. GDF has schedules for federal transient camps: EL, HKX, ANO, KIJ, AEK. IQY has c.c. P.P. '10 hnal. IZU has new super. GGS and BLP had all-night session with Budlong of HQ's at recent Federation of So. Calif. meeting. KRU is new Tucson ham. DCQ is completing new rig. FZQ is on 7294 kc. GYM has c.c. outfit. JYQ is rebuilding to c.c. P.P. 211 job. KIR (ex-8ZZB-8ZZBC) may soon sign as an X in Mexico. DPS was home for visit from L.A. radio school. KOK reaches back east with '45s. IMR is on 14 mc. AND received worked card from Belgium. GZU and EFC are on 14-mc. 'phone. FEA has three complete '52 rigs. EAW is on 1.75 mc. BRI had her face lifted gratis—by old Sol! GBN is overhauling receiver and generator's gas engine. BFA schedules Army portable QC for traffic to Major's wife. HAX had GGS and BLP for visitors. GFK is strictly portable. JHF stays on 7 mc. exclusively. KBJ ordered new Westinghouse cabinet. CEC and BVN are about to return to the air, at Sunnyside, Calif. Club meetings at Phoenix are every other Wednesday at 7:30 p.m., M.S.T., at C. of C. Bldg. More O.R.S. and O.P.S. are wanted. Let's have more applications!

Traffic: W6ALU 900 IIG 74 QC 44 KOL 7 FIP 5 HCX-ISO 4.

PHILIPPINES—SCM, Newton E. Thompson. KA1XA --P.A.R.A. meeting was held at KA1JR, June 24th.

Traffic: KA1HR 1641 NA 642 EE 522 CM 327 AN 239 LG 223 RC 175 CS 161 SX 100 FS 96 XA 60 JR 12. KA4GR 28. KA9WX 28. OM2AA 372.

SAN DIEGO—SCM, Harry A. Ambler, W6EOP—FWJ handled considerable Asiatic traffic through K6EWQ via 6AZU. BHF schedules portable at Y.M.C.A. camp. FQU has new c.c. rig. EFK is southern terminus for trunk line F. KBD is rebuilding to 860 final. BOW schedules EZD in Utah. IBK and LD are rebuilding 'phones. CNK is looking for new receiver. GTM worked F and VO. FKT reports Fallbrook Radio Club active. BAS had SW3 stolen. AKY had SW3 and transmitter stolen. HQM worked VO. BAM says 14-mc. DX is good. DNW returned from camping trip.

Traffic: W6FWJ 1229 BHF 152 FQU 94 EFK 47 KBD 21 BOW 19 IBK 13 AXN 12 CNK 6 GTM 3 FKT 2.

SAN JOAQUIN VALLEY—SCM, G. H. Lavender, W6DZN—AAJ ops at Fresno C.C.C. camp. GXL is building portable. KEV is building s.s. super. BXB worked a VK. GEG is heard again. JIN is in S. F. strike area with N. G. FFP is in race for S.C.M. COJ has new rig. DQR is on sea with U.S.N.R. SF keeps busy shooting trouble for hams. IKG was elected secretary of Stockton Radio Club. KGO went to sleep during a QSO. GJJ works in lumber camp. FV and CQI work 'phone. HIP can't tune his feeders. HLJ is on 3.5 mc. DXL, after five years of rebuilding, is still at it. In 1919 DZN was QSO QL; the last QSO was July, 1934, making 15 years between contacts. BHQ is working trans-Pacific schedules. CVT puts out a sweet signal. CVL had to move rig out of house. During labor strike Manteca Radio Club was ready to go with portable in case power was shut off. Better start making plans for convention in Fresno in November.

Traffic: W6DZN 49 EXH 24 KEV 6.

ROANOKE DIVISION

NORTH CAROLINA—SCM, G. H. Wright, Jr. W4AVT—Next meeting of Central Carolina R.C. will be held at Winston-Salem, Sunday, Sept. 2nd; all hams cordially invited! MR reports plenty of 28-mc. activity. MR and AH-ET received W.A.C.'s. CJP operates portable at Boy Scout Camp. CCH and BQZ have new receivers. CFL and CAY are off due to storm. First traffic

report from CVU. AHH is building 3.9-mc. 'phone. CVU is building new 1.7-mc. 'phone. CYY is building new c.w. transmitter. BLN is adding '03A amplifier. CXC and CXS are building new c.c. transmitters. CPA is building new rig. BRT worked HC1PZ. NC worked hard during O.R.S. Contest. BDE and BX visited 9USA. PA is married. Congrats. New O.R.S.: BV and BRT. AEH is working for O.R.S.

Traffic: W4BRK 21 CJP 12 AEH-BRT 8 CVU 7 NC 6 BV-CCF-COK 4 BVD-BWE-OG 3 CCH-BYA-IV-CXF-CXJ 2 CYA-BLN-CXC 1.

VIRGINIA—SCM, R. N. Eubank, W3AAJ—ANT schedules K5AA daily, K5AF Tues. and Fri. BZE has Third-Class Phone ticket. DQB is c.c., '47-'48. BTR and BSB are on 14 mc. ECQ has '47 c.c. DBI is Petersburg S.W. Club. CKM is on 3.5 mc. EGD is building c.c. rig. EHL uses '47. ENO is QRL summer school. MQ is building 56-mc. rig. BAG has Tri-tet. EPK is on 3785 kcs. DZW is building s.s. super. BYA is WLQJ. DCU schedules BYA and CYK. CSI schedules BYA. BAN helps 'em get in band. BTW has new RK20 rig. APU is building 1.7-mc. 'phone. EPS reports for first time. CYK operates 3.9-mc. 'phone. AMB is QRL Scout Camp. EBK has power supply trouble. FJ will have rigs at N.G. Camp, Va. Beach. BEB uses 1.7-mc. 'phone 75% of the time. BIG is on 3995 kcs. 'phone. AAF and BAD visited World's Fair. EBD schedules AMB and EBK. CFV is off air due to lightning. AOT is in Indiana. BDZ, AEI, AIJ and FE are rebuilding. BRA was QRI Y.M.C.A. Camp. BZA has 56-mc. rig. EOQ, our R.I., sends first monthly report. CXM is still in Walter Reed Hospital. GY is Kingfish O.P.S. DDA is QRL duty with U.S. Fleet. CIJ is interested in directional antenna. CA is doing FB work for convention. BZ is very active on 28 mc. DEH has First-Class Tel. ticket. BPI worked on hamfest. BGS is on Sundays. ASK is exp. with Class A Prime. EAI has new Ford. CQW will be on 1.7-mc. 'phone soon. COO has Patterson PR-10. AFT, Major Hawthorne, is now Comm. Officer U.S.M.C., Wash'n. ELJ has new transmitter. BRD is interested in 28 mc. DDG is on 1890 kcs. 'phone 100%. EEN was on long trip for U.S.N.R. Make plans for Roanoke Div. Convention, Roanoke, Oct. 5th-6th. Good program planned. Write 3CA. Danville Club pulled swell hamfest for Va.-N.C. Floating Clubs, July 15th. 28-mc. stations or higher, please advise 3AAJ. 3BWT and Virginia A.A.R.S. Net operate on schedule daily at 7 p.m.

Traffic: W3ANT 200 BZE 20 DQB 18 BTR 1 ECQ 13 DBI 7 CKM-EGD 4 EHL 3 AAJ 6 ENO 3 MQ 2 BAG-EPK-DZW 1 BYA 145 DCU 11 CSI 9 BRY 7 BAN-BIW-CPN 3 APU-DWE 2 EPS-CYK-ELA 1 AMB-EBK 35 FJ 33 BEB 30 BGE 3 AAF-BSB 1 EBD 24 CFV 2 BKJ 1 DDG 19.

WEST VIRGINIA—SCM, C. S. Hoffmann, Jr., W8HD—EIK-WLHG has honor of being temporary Alternate Army N.C.S. Ed. Day of WLM spent vacation with EIK. DPO's W.A.C. certificate arrived! A baby girl arrived at home of HD/WLHF, S.C.M., June 27th. FQB desires to join A.A.R.S. HWT is new O.R.S. ELJ was on vacation in Virginia. OK-EL and LJX reported going to N.G. Camp. JRL uses 600 watts. CVX and Ex-GDF married. Congrats! KKG installed Tri-tet. CMJ's O.R.S. was endorsed for another year. ESQ and GAD are trying to get GBF on again. KXC, KWL, KWU and KWW are heard on 3.5 mc. HSA has YL-its! Mountaineer Amateur Radio Assn. (Fairmont) elected following officers: JEL, Pres.; KGT, V. Pres.; KWW, Secy.; ESQ, Treas.; JM, Activity Mgr. JWL celebrated his first year as a ham on July 1st! Both ops at TI are going to summer school. JWL and CVK are heard on 1.7-mc. 'phone. AMX is operating "WFPF." BDD is building 1.75-mc. 'phone. LSJ and LSK are combining rigs on 1.75-mc. 'phone. GB is on 3.9-mc. 'phone. EYV is new O.P.S. AHH is Phone R.M. for W. Va., and is trying to organize a 'Phone Net. He would appreciate hearing from all 'phone hams. Following from W. Va. attended Convention in Pittsburgh, during June: AMX and YF, BOW, BTW, CMJ, EP, GBF, HD, Reger of ILY, JM, JWL, LBE.

Traffic: W8EIK/WLHG 557 HD/WLHF 5 FQB 2

HWT 29 JRL 1 KKG 97 JM 4 KVV-BDP 2 KWL 5
BDD 141 LSJ 3.

ROCKY MOUNTAIN DIVISION

UTAH-WYOMING—SCM, Arty W. Clark, W6GQC-IDM—Utah: 6HVU built 28-mc. rig. JYD and KDI keep schedules. KOP built Collins coupler. GQR filled vacancy to Ft. Douglas Radio WVX when FAE left. BTX is one of the "savages" at Yellowstone Park. DGR left for N.C.E. cruise. IAL built portable receiver. KFW took portable on trip to canyon. ZZBI went to World's Fair. Wyoming: 7COV is back from Princeton. EKR gets results from low power. ARK and CRP appeared on opening program at KWYO, Sheridan. EMQ is new Rock Springs station on 1.75-mc. 'phone. BJS is first O.P.S. in Section. DIE is crashing ether. COH is fixing "bus" for vacation trip. CSE says, "Too much fishing." We regret to announce the death of 6JXU, Earl N. Richins of Bener, Utah. His brother amateurs will miss him greatly.

Traffic: W6FRN 377 GQC 343 BSE 166 KDI 74 BTX 57 HVU 18 AFN 5 JYD-KKM 2. W7COH 63 CSE-DIE 7 BJS 2.

COLORADO—SCM, T. R. Becker, W9BTO—PWU is rebuilding 'phone. GJQ is moving out of state. IFD schedules VK. NIT built a Tri-tet. ECY is on with new c.c. rig. EHC is using Tri-tet. FXQ is now at Craigmoor. PNP handled a mess of D.A.V. convention traffic; P.P.A.R.A. furnished him some operators, including KI, DYP, KNZ, LJP and AMS. PRF has an RK20. JRV is at boys camp. PGS blew his '10. HIR is on 'phone. SAX is new ham. IPH has elaborate frequency measuring set-up. BYK changed Q.R.A. LYE is in Texas. BYY is building condenser mike. KGR is vacationing in east. FYY and HRI are building Tri-tet. JGA is back in Denver. ESA is enjoying vacation. FA has his QRA with APR. EMU is on vacation. AAB is QRL photography. JB helps keep KGPX on the air. BTO goes fishing. JNV is back from Navy cruise. BJN is in the crystal business.

Traffic: W9PGS 2 PWU 5 GJQ 1203 ECY 4.

SOUTHEASTERN DIVISION

ALABAMA—SCM, L. D. Elwell, W4KP—SN worked a VK on 14-mc. 'phone. BJA made good total in Ala. QSO Party. DS, Chief R.M., is QRL A.A.R.C. RS and BZG are rebuilding. HO moved back to B'ham. ANT is starting on c.w. soon. GL, R.M., reports the Mobile gang rebuilding; i.e.—BXV, CRF, CQM, CQV, GL, OA, and CBI. COU passed 1st class radio-tel. exam. CIQ is being moved to new club room of M.A.R.C. CUE, station of B'ham Club, is new O.B.S. APU is serving third term as club president. BOU is headed for N.G. camp. BMM is preparing for O.O. job on 'phone. ATD claims he was QSO Jupiter. CYW is building new receiver. BPW of Georgia has job in B'ham. BHY is rigging up an FB station. CIU passed O.R.S. exam. GN is building super-hets. Don't forget Convention at Mobile in Oct.

Traffic: W4SN 76 BJA 44 DS 32 APU 26 BOU 17 BZG-BMM 6 ATD 3 KP 11.

EASTERN FLORIDA—SCM, Ray Atkinson, W4NN—ANY (studying in Washington) says "Hello, gang." AQU applies for O.P.S. CCR reports Sarasota gang getting results with new emergency portables. AYO has new 830. CFO can't kick his '04A. BHC is building emergency equipment. Be on watch for distress signals throughout next two "Storm" months. Get nets and emergency schedules in order. Jacksonville stations ('phone and c.w.) will stand by day and night to render assistance. BCZ, "Kingfish" of "The Meters of the Morning" 1.7-mc. Storm Net, reports hamfest will be held on Labor Day, sponsored by St. Petersburg A.A.R.C. For details write Phil McMassters, 212 9th St. North. ASR says BWZ is moving to Sanford. BQD has FB public address system. AS is doing some 56-mc. work. ASR and BCZ have new emergency rigs. CWW says, "Look for a strong ground wave. My antenna is down again." BRA applies for O.R.S. ACZ has healthy sig. DU, NN, and AGB are making night tests on 56 mc. AZB blew power transformer. Don't forget South-

eastern Division Convention, Mobile, Ala., Oct. 19th-20th.

Traffic: W4NN 64 AGB 6 ASR 7.

WESTERN FLORIDA—SCM, Edward J. Collins, W4MS—CDE rebuilt rack and panel. CTZ is c.c. BPI is rebuilding to c.c. AXP is U.S.N.R. control station. KB's hamfest was success: Hams present from 5 states, 2 districts. BGA is moving. CTA is building a.c. receiver. BFD is QRL Drug Store. VR located receiver trouble: was head 'phones. Hi. COG is collecting material for shack. ACB is at F.N.G. camp in Jax. QR holds midway down. AUW is on 14 mc. for summer. CRU gets out FB. CUR's signal has most sock in Section. CQF schedules AXP. AGS renews O.R.S. BSI is improving FB7A. ASV has new '10. Mrs. 4QU had operation. QK and AUA are QRL U.S.N.R. CBD sold his transmitter. MS is listening on 28 mc. CMJ is on 56 mc. AQA, ABK, BGB, ARV, CSL, CSR and CQP report. We regret to report the death of 4BKV of Tallahassee, killed in motor accident. He was a real ham and will be greatly missed. We're counting on West Fla. gang to attend Southeastern Convention in Mobile (Oct.) 100%.

Traffic: W4CDE 7 CTZ 5 BPI 1 AXP 12 KB 11 VR 3 CQG 7 QR 8 MS 14.

SOUTH CAROLINA—Assistant SCM, Bannie L. Stewart, W4CE—BDT is joining U.S.N.R. BNN has 1.7-mc. 'phone. BPD is on 14-mc. 'phone. CQQ plans to attend college this fall. GI is on 7 mc. BJC is on 3.5 mc. CPB is new Greenville ham. BFK is operating as portable in Danville, Va. CUS is Doc. Zeigler, an old-timer. CYG is now on the air. CZA is active on 3.5 mc. CYT is new Columbia ham. CVD is new Sumter ham. CYJ is coming on air in Georgetown. BNN built new 'phone per May QST. BAT is active on 7 mc. BQM is building new receiver. CSV is in U.S.N.R. CSV joined N.C.R. OW is chief opr. of Eastern Air Line Station WEEF. CE will be teaching high school in Georgetown this fall. Plans are underway for an all-S.C. QSO Contest to be held in late fall. Prizes to highest scorers. The Asst. S.C.M., 4CE, would like to hear from every amateur in South Carolina each month. The address is Bannie L. Stewart, 4CE, Georgetown, S. C.

Traffic: W4KV 419.

K5AF/WZAL is upholding the A.A.R.S. in the Canal Zone. Traffic handled for June-July period totalled 201.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, Glen E. Talbutt, W5AUL—EGM, Terrell Club station, was on in a big way for Legion celebration. BII is going to T.N.G. camp. CPB joined A.A.R.S. and U.S.N.R. EES has sure-fire click eliminator. EEF is looking for traffic. CXS wants O.R.S. BCW is DXing. NW reports good ops on 7 mc. DXA has new s.x. super. CPT joined U.S.N.R. EIM is new Dallas ham. EEW wants schedules. EFC and EFN are up-and-coming hams. AZB moved to Childress. BZT is learning to pilot plane. ANU is ice man and crack shot with rifle! DAF has new c.c. rig. COK is in Chi. CDC is on 7 mc. CRP is still in "valley." DUR "broke into print." DM has 250 watts input. AJ intends to use 14-mc. 'phone. IT is on 'phone regularly. ARS is going on U.S.N.R. cruise. BKH, CFM, CPU, DAV and CMJ visited S.C.M. AW, AUJ, BCE and QA go to T.N.G. camp from Abilene. We need some good O.O.'s, O.P.S. and "active" O.R.S. Let's hear from you fellows.

Traffic: W5EGM 246 BII 106 ZD 85 CPB 74 EES 54 DAA-AW 28 EEF 22 CXS 15 BCW 12 NW 10 CHJ 8 JA 7 ARV-DXA 6 CPT 3 DAF 14 EEW 4.

OKLAHOMA—SCM, Carter L. Simpson, W5CEZ—CEZ took his vacation at home in bed with a case of mumps. Hi. BQZ blew one of his tens. EFK sends a combined traffic report for AEF, CVA and himself, who operate same station in N.G. Armory. AMT runs five schedules. EHP is new reporting station. CON is spending summer in Calif. DTC has nice schedule list. BKK puts out swell signal. AIR, an old-timer, is staging a come-back. BDX is playing with 25 and 56 mc. DDW has new 830 rig. EHS is new Tulsa ham. BWN is moving station to basement. CFA moved to Ponca City. CRS is new O.R.S. RF is active in N.C.R. BJG is rebuilding

receiver. AVK reports silent key, Lloyd Flood, W5DEY, exW5BLB, who was killed in dynamite explosion. DPK, Shawnee, reports for first month on the air. ASF is back after year's absence. EIA is new Ponca City ham. AVB takes vacation up north in lake country. ATB has pair of '52s.

Traffic: W5CEZ 266 EFK 91 BQZ 71 AMT 45 EHP 32 CON 25 DTC-BKK 13 AIR 11 BDX 7 BAR 6 EHS-IDW 5 BWN 2 CFA 1.

SOUTHERN TEXAS—SCM, David H. Calk, W5BHO—PF is spending summer at Tex. Univ. BWM reports EIS new call in San Ant.

Traffic: W5MN 209 BFA 69 BJ 15 MS 12 CVW 7 ADZ-PF 6 BWM 5 DPX 2 REF 25.

NEW MEXICO—SCM, Dan W. De Lay, W5DUI—DUI is blasting new holes in rig for one k.w. DLG has been QRL power company. CSR has '52 final. EAO's family moved here from Pueblo. AOE and ASR are building new 'phone together. EIT is new ham in Olive, N.M. CSR, AOP, AUG and BNT are going to National Guard camp. AOP is taking portable to schedule DUI.

Traffic: W5DUI 15 DYV 58 CJP 53.

CANADA

MARITIME DIVISION

MARITIME—SCM, A. M. Crowell, VE1DQ—EA has five crystals. GR is rebuilding 1.7-me. 'phone. FT is reliable P.E.I. 14-me. station for traffic. DQ is completely rebuilding. ET has new rig practically finished. EP is still swatting the old DX station. AG is low-power battery station. AQ is active on 1.7-me. 'phone. FB, QSL Mgr., reminds some of the active out-of-town stations to send their envelopes for cards.

Traffic: VE1EA 3 FT 4 GL 2.

ONTARIO DIVISION

ONTARIO—SCM, S. B. Trainer, Jr., VE3GT—QK, new R.M., leads Section in traffic. JT, new Chief R.M. for Ontario, relayed VK message to H.R.H. Prince of Wales which IB got from VE4BF. DU is all set again for traffic. KC moved to VE2. GH blew 3 K.V.A. 2200 volt transformers on a Sunday; also '66s. MB visited SHQT and 8ISQ and was visited by VE3LB and XS. VD has amusement park QRM and N. SZ sends nice report. JV gets DX traffic. RM says, "any cards, ma?" QN is QRL YL. NO keeps good summer schedules. MX is out of town. ER has been logging much DX. WX left for summer cottage. SG handles centennial traffic; he was visited by SCKU. WT and WU are rebuilding to c.e. ZE and JD are newcomers. UF and UU have c.e. rig going FB. PN is coming on 14-me. 'phone. GT and partner visited 8DYG and Co. EM is settled at new QRA. OR is installing c.e. DV is active. QB and SA biked 50 miles to visit TF. RK did 55 miles to visit SA. IQ is on 'phone exclusively. MZ is new in Ancaster. WE moved to England. HP is rebuilding for busy winter. FP, KM, IQ and ZD are 56-me. experimenting. WK keeps fine schedules. UY is about to go. II gets out well on 3.9-me. 'phone. HA, HY, DD, GX, ET and CX are out with the forestry. RL, LN, OO and NU went fishing with IB. PM is building new store and shack. TB is trying 28 mc. Ontario Division Convention: Toronto, Oct. 5th and 6th. Write S.C.M. for particulars. SA spent couple of weeks at Lachute, P. Q., as guest of 2FR and 2GH.

Traffic: VE3QK 421 JT 103 IB 28 DU 3 DW 1 MB 7 VD 8 NO 94 MX 3 ER 6 WX 88 ZV 6 BZ 5 SG 113 GR 1 UU 3 GT 80 QB 14 IQ 2 WK 65. VE9AL 8.

QUEBEC DIVISION

QUEBEC—SCM, J. A. Robertson, VE2GA—Presidents of M.A.R.C. and S.S.R.C. both added to family during month. DU, a girl; GA, a boy. EE contacted VE2DQ in England. New receivers at GO, DG, EE, BB lost top of mast in recent storm. HK and IE: rebuilding. HN has portable on yacht. CX and CO are experimenting on 56 mc. DX is worse with "YLitis"; HP infected also. CA has birthday party. BT sends family to country

and disturbs the ether badly. DR now has a monitor!! CF, DJ and AY: selling out. BG lost mast when runaway horse and rig became entangled. HH is going c.e. AP had big christening party for new rig. AC is on regularly on 28 mc. BU keeps excellent schedules. IHPV visited CG. Welcome to IT. Nice letters from EC, HG and BK. Believe BK (age 15) is our youngest ham. Mrs. CA, BE, CA, BT and BG visit S.C.M. HG requires only Asia for W.A.C. CH elicits "J" for W.A.C.

Traffic: VE2HG 6 BK-EC 2 CA 14 BU 54 AC 20 DG 38 GA 2 DR 16 BG 20 BB 6 CG 9 CO 3 GO 2.

VANALTA DIVISION

ALBERTA—SCM, J. Smalley, Jr., VE4GD—OA uses M.O.P.A. KD is becoming a traffic hound. LX will feed any visitors strawberries and real cream. HI, QX is getting some DX. HM worked his first J.

Traffic: VE4OA 5 KD 7 KG 8 LX-BZ 32 QX-HM 3. BRITISH COLUMBIA—SCM, R. K. Town, VE5AC—HC operates at Y.M.C.A. camp. JH migrates to 3.5 mc. for traffic. FG hopes to schedule Bedaux Expedition. KN schedules JK on 1.7-me. 'phone. AL plans low power rig. DB, Y.M.C.A. camp station, helped locate missing launch. EU holidays among W6 and W7 gang. AS takes transmitter to church camp at Tunstall Bay. JK makes BPL on 1.7-me. 'phone. HP is arranging station for Victoria Y.M.C.A. EZ hits a pair of tens with a quarter k.w. CV got traffic bug. EP has c.e. rig going FB. DF is commercial operating. HU plans more power. BC will be on 56 mc. soon. GT handles traffic and press for Mount Chirillon Expedition, Alaska. AC is signal NCO at artillery camp in Alberta. EG helps Y.M.C.A. camp traffic. HW just married. BW is QRL picking fruit. DC visits Vancouver. BL saved a baby girl from drowning. IR is operating at Victoria Y.M.C.A. camp. IC is going to help IR. BR holds schedules. GE returns from Stanford. JC has P.P. fifties final. JL rebuilt to c.e. EC is building c.e. rig.

Traffic: VE5HC 21 JH 2 FG 16 KN 9 AL 4 DB 231 RU 16 AS 170 JK 189 HP 43 EZ 40 CV 141 EP 13 DF 38 HU 36 BC 7 GT 25 JO 8 AC 133 FC 63.

PRAIRIE DIVISION

MANITOBA—SCM, Reg. Strong, VE4GC—KU has 211 in final. BG has Tri-tet. IU is on 7 mc. FN is leaving for England. AG has been on holidays. LH is looking for DX QSLs. KY forwarded message to Prince of Wales. MW is looking for traffic. DU tested out VYW. MV has a 50 pushing a pair of 50-watters. IT has FB Class B modulator. NW gets DX QSLs. GC needs VYW to keep him on the air. NAM has a 59 modulated. NT tried a rig at the lake. QN holds out on 3.5 mc. IA is new station. HZ is rebuilding for pair of 50-watters. MY has transmitter at the lake. LL has XYL operate the 'phone. CQ, GL, KX and FU are on 14-me. 'phone. Active stations: PC, QY, RA, QD, TJ, CD, LT, RF, TV, and QA. RO has c.e.

Traffic: VE4LB 13 GC 6 RO 5 TJ 4 PC-KY 2.

SASKATCHEWAN—SCM, Wilfred Skaife, VE4EL—CM gets great results from c.e. 150-watt c.w. and 'phone rig on 3524 kes. OE is operating 7CIJ at Ladder Lake Air base. KE has dandy 'phone. For speedy traffic handling, remember that EH schedules Brandon and Saskatoon; PM Winnipeg and Edmonton; EL Weyburn, Saskatoon and Buchanan; OC Winnipeg, Regina and Swift Current; GR Regina, Vancouver and N.B.; ND Lethbridge and Regina. Your S.C.M. visited KE, ES, OC, GA, ML and DI. GA and EU had nice time at Lethbridge Hamfest and spent week with 5FTL. ML has c.e. 'phone on 1.7 mc. RI has YLitis. QF is welcomed back home. PW increased power. RB has new receiver. QZ is handling traffic. MA burnt out power supplies. LI is building Tri-tet. JB is trying 7 mc. MH is on 7 mc. QP had real time on West Indies cruise as opr. on H.M.C.S. Vancouver, visited 6RZE and 6GSN, also VP4TC at Port of Spain. PM is c.e. EL is on 'phone: 3520 kes.

Traffic: VE4GR 37 MH 35 EH 27 EL 20 GA 13 QZ 12 PM-CM 8 LI 7 ML 4 FW 2.



CORRESPONDENCE

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Probationary Period? Yes!

Riverhead, Long Island

Editor, *QST*:

I should like to take advantage of the invitation in the editorial columns of July *QST* for discussion on the question of restricting the activities of beginners in amateur radio. There is no doubt that we are in dire need of some sort of restrictions. A few hours of scanning the high-frequency amateur bands should convince almost anyone.

In any highly specialized field of endeavor it is common practice to put beginners on a probationary period during which they gain practical experience. Consider, for instance, a medical student. When he graduates from college, do they hand him a thermometer and a bag of instruments and let him run wild? . . . Before a doctor can go out into practice he must serve as an interne in a hospital for about two years. In this period he learns to put his theoretical knowledge into actual use. Suppose you wanted to become an airplane pilot. Would you study a set of more or less standard questions and answers, take an examination, and, having passed, step proudly into the cockpit of a plane and "give it the gun"? Of course not! Yet in amateur radio thousands of fellows who don't know what it's all about are going on the air without any previous experience. . . .

It may safely be said that about ninety percent of the amateurs at the time of passing the examination for an amateur operator's license know practically nothing about radio. True, they have satisfactorily answered the questions asked, but what does that mean? Nothing at all. Anyone with a good memory should be able to pass the exams whether he knows what he is talking about or not. It isn't a test of one's knowledge of the subject. Many 'phone amateurs in the 4-mc. and 14-mc. bands, who are supposed to have superior technical knowledge, seem to lack a thorough understanding of what is going on in their sets. Just listen to the twaddle bounding back and forth in these 'phone bands some time when you feel in the mood to be amused. Even amateurs of many years' experience sometimes have the most fantastic ideas of the simplest radio phenomena.

New amateurs should certainly be kept out of the DX and the traffic bands until they have become proficient in handling a station. The best of equipment in the hands of an unskilled operator

may cause unnecessary havoc, and most beginners start out with the flimsiest of makeshift apparatus. It is just such stations that are likely to have notes covering half the band, making life miserable for everyone else, or, worse yet, to be operating outside the bands and giving amateur radio a black eye.

It is well known that in most foreign countries certain restrictions are put on the activities of beginners in amateur radio. Probably the most familiar example is in the case of England, where, before an amateur can go on the air at all, he must operate for a given period with an artificial antenna. This arrangement gives him all the advantages of actually being able to tune and operate a transmitter without the disadvantages of improper radiation. There is no way to become accustomed to the feel of handling apparatus except by actual practice. However, some discretion should be used in selecting the place for this practice. If you were going to learn to drive a car you wouldn't pick New York's busy Times Square as a nice place to do it. You would naturally go where there was as little traffic as possible, where you wouldn't be so likely to get into trouble.

. . . The ideal solution for minimizing interference from beginners is, of course, the artificial antenna arrangement. However, rather than to impose quite such a drastic restriction on beginners, I should recommend that, after passing an examination such as is now given, they be issued a provisional operator's license, for a period of two years. This license should allow operation in the 1.8-mc. band only. At the end of one year, but not before, the holder of such a license, providing he can prove a certain satisfactory amount of actual operating activity, should be eligible for a practical examination. This should be an actual test in operating technique, to show whether or not the candidate is fit to be allowed in the higher frequency bands. Upon successfully completing the test he should be issued a regular operator's license.

. . . I believe that a procedure such as outlined above would tend to raise the general standard of amateur radio. To open our crowded bands to anyone who can pass the present exams is exceedingly undesirable, but to allow the same privileges to the holder of a class C license, where the chances of dishonesty in taking the exam are so great, is a rank crime.

—Arthur M. Braaten, W2BSR

No!

4 Hemlock Place, New Rochelle, N. Y.

Editor, *QST*:

After reading your editorial in the July issue asking for a discussion of the problem of occupation of the amateur bands by new amateurs, I must raise my voice against the suggestion appearing therein.

Restriction of operation in the higher frequency bands, merely because the operator is inexperienced, seems to me to be unjust. In my opinion, the larger part of the interference to be found in the 7- and 14-mc. bands is caused not by new men, but those in the game long enough to know better. Almost invariably, the new man is the one who has taken to heart the now famous precautions and rules for obtaining a p.d.c. wave free from annoying wabulation, and can quote *QST* and the Handbook on this question. He is enthusiastic, and perhaps the greatest desire he has is to work some DX. Should he be denied this thrill by being relegated to a band which is less desirable from this standpoint? No, OM, he deserves more welcome than that. There's room in these bands for every ham who is willing to put out a decent signal. QRM resulting from overoccupation of the bands must be answered by a demand for more space, use of more selective receivers, and a little courtesy and consideration for the other fellow.

If we must resort to discipline in the form of restriction, a good plan might be to require any man who has received a notice from the authorities on account of gross infraction of the laws, to spend a probationary period where he may repent and improve his equipment.

I heartily approve the method used to restrict 'phone operation in the prize 'phone allotments. This same method might be used to advantage for the c.w. man. Let him demonstrate his technical ability by examination, and let him answer the questions correctly that assure the licensing authority that he knows what causes bad signals and that he knows how to overcome them; but keep these examinations open to the new man. If he passes, let him go immediately into the DX bands and not into the less efficient lower frequency bands to let his enthusiasm cool and keep him from making frequent foreign contacts.

I believe the majority of the men feel the way I do about this question. They will put up with crowded bands so long as these bands are not cluttered up with rotten, illegal, selfish signals, for which there is absolutely no excuse in these days of crystal control, stabilized oscillators and low cost filtering devices.

—John J. Ormston, Jr., W2CFN

What the Senators Said

St. David's, Penna.

Editor, *QST*:

I have every desire to avoid acrimonious discussion with any member of the amateur fraternity, but I feel it my duty to take exception to a statement appearing in the unsigned "radio-torial comment" of the magazine "Radio" in its June issue. . . .

The statement referred to appears in the second column. Reference is made in this column to verbatim remarks of several senators as reported in the "Congressional Record" of the Legislative Day of April 26th. This is a very indefinite way of indicating the actual date when the remarks were made in the Senate, for, as a matter of fact, due to recesses taken from day to day, the Legislative Day of April 26th continued over many days, namely, from April 26th to May 9th, inclusive. If the writer of this editorial had knowledge of what actually occurred, it would have been much more accurate to have made reference to the date of the "Congressional Record" upon which these remarks were made, which was May 1st, the date the Madrid Telecommunication Treaty was acted upon in the Senate and the Resolution of Ratification was agreed to.

The statement referred to in the editorial reports that when the Madrid treaty ratification came up for discussion in the Senate, several senators stated that many amateurs had protested the new restrictions, "but since the organization they believed was speaking for the amateurs did not oppose the treaty, they had come to the conclusion that it should be ratified."

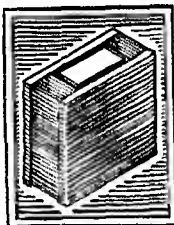
No senator made any such statement during the treaty discussion referred to. All the remarks made upon the floor of the Senate regarding protests of amateurs appear in the "Congressional Record" of May 1st, the exact copy of which remarks follows, to wit:

"Mr. PITTMAN. Mr. President, this matter has been under consideration since 1925. About that time there was held in Washington an international convention dealing largely with the same subject. However, there were certain regulations provided by that convention, dealing particularly with telegraphic communication, which were opposed in the United States. First, permanent committees were appointed to work out the problems. At the meetings articles of convention were worked out, which were then taken up at Madrid. At Madrid the convention now under consideration was adopted.

"I may say that by this convention it is intended to regulate the three forms of communication—the telegraph, cables and wireless. The convention has been very carefully worked out for the purpose of preventing interference in the various countries, and facilitating communications and deliveries as between connecting companies. It has also dealt with the bands or wavelengths so as to overcome any conflict as between different nationalities.

"I may further say that only one thing was brought up before the committee that caused the committee to hesitate with respect to this treaty, and that was the protest by the amateur broadcasters. They felt they were discriminated

(Continued on page 66)



In spite of Jim Lamb's articles in past issues of *QST* about single signal reception and quartz crystal resonators for use therewith, we still get enough query letters each week to indicate quite definitely that few indeed of the general run of amateurs have a thorough understanding of many of the essential details necessary for the proper functioning of this type of circuit.

Perhaps the greatest misunderstanding centers around the resonator crystal and its holder. It is surprising to us how many amateurs do not realize that the crystal must not be under pressure, as in the case of the crystal used in an oscillator. For resonator purposes, we have found

an air gap of approximately .003" to be essential. In order to properly maintain this air gap, we have found it most practical to separate the holder plates by means of two carefully ground glass parallel bars or spacers, the crystal itself being placed between these two spacer bars. From our correspondence, it would seem that many of the amateurs assume that we are using three "trick" crystals, apparently concluding that the spacer bars are quartz crystals.

In an earlier model filter, we used a bakelite spacer ring surrounding the crystal. This ring was carefully ground so as to provide the .003" air gap between the crystal proper and the plates, and it was startling how many amateurs complained to us that upon opening their crystal holders they were surprised to find that we had been careless in using a spacer that was thicker than the crystal and consequently prevented the holder plates from touching the crystal — how they had to "file down" the bakelite spacer ring until it was thinner than the crystal!

Of course the necessity for carefully washing the crystal in carbon tetrachloride after handling is just as important as with transmitting crystals. While not thoroughly realized, this point has apparently gotten over better than some others.

Then there is the matter of polarity of the crystal holder. When using a holder with horizontal plates, it is important that the holder be inserted in its socket the same way at all times; otherwise it is necessary to re-balance the bridge circuit. The necessity for this will readily be understood when we realize that the capacity between the bottom plate of the holder and the metal chassis is quite large, relative to the capacity between the upper plate and the chassis, and consequently will have a very appreciable effect upon the setting of the neutralizing, or balancing, condenser.

Of course, the importance of having the I.F. amplifier lined up and tuned to exactly the crystal frequency cannot be stressed too much. If the I.F. amplifier is lined up to a slightly different frequency, there will be a marked attenuation of all signals when switching from the straight super to single signal. When properly lined up, the well-designed Lamb type of single signal filter circuit will cause an attenuation to a pure D.C. signal of but 3 db. Of course the attenuation to a modulated signal is extremely great, due to the tremendous selectivity and will vary with the setting of the selectivity control.

We are very much sold on the merits of the single signal receiver for c.w. reception and are incorporating in our new De Luxe ham receiver, that we mentioned on this page last month, the same type of Lamb single signal filter circuit we are now using in our FBXA and AGSX receivers.

We have, however, designed a new resonator and crystal holder which is molded of our own low-loss R-39 material. This holder, together with a slightly revised crystal, has been in experimental production and test for several months and will be included as standard equipment in the FBXA'S, as well as in the new receivers this Fall.

JAMES MILLEN



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Here you have a portable A.C. transceiver which includes power supply in the same case (size only 6 1/2" x 7 3/4" x 12 1/4"). It can be operated anywhere that 110 volt A.C. is available.

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Correspondence Dept.

(Continued from page 64)

against. They were heard, however, in the matter, and those who were inclined to support them very frankly came to the conclusion that under this treaty the amateurs received protection such as they did not have before, and their supporters thereupon withdrew their objection to the treaty. Their protest was based on the ground that at the present time amateur broadcasters, who have accomplished so much for the science, are allowed in most places to send messages to a third person. We have made no objection to that in this country, but in most places in Europe radio broadcasting is owned and controlled by the government, and they do not desire the competition by amateurs in the absence of regulations governing it and in the absence of provision for licensing. On the other hand, without this treaty, which does allocate or set aside so many bands or cycles for the use of the amateur broadcaster, they would have no protection whatever in the use of radio, but might be stopped in any country whose government saw fit to stop them.

"So I feel that the only protest that arose has been absolutely satisfied, so far as the committee is concerned. I may say that the committee brought before them a number of experts of the Government who explained this matter in detail and completely. I think that there can be no objection to the treaty."

"Mr. WHITE. Mr. President, because of the fact that at one time I expected to be a member of the delegation which negotiated the pending treaty, and because of the further fact that I attended many sessions of those engaged in the preparation of the United States proposals presented to the Conference which drafted the treaty, perhaps, it is not inappropriate for me to say a word at this time in behalf of its ratification.

"The treaty in some respects represents a very great advance over international regulation of communications. Until this treaty was negotiated, although wire and radio communication had been coming technically closer and closer together through the years, there had been separate agreements dealing with the two forms of communication—a wire convention, to which the United States had never been a party, and a radio convention to which the United States had been a party since 1912, I believe. In the pending convention both forms of communication are dealt with. I may say that the plan of this convention responds to the thought and purpose and to the proposal of the United States Government and of the delegates of the United States at this international gathering.

"The convention is composed, first of all, of provisions which deal only with the general principles relating to communications. It next has an annex embodying general regulations which seek to amplify and make effective the general principles contained in the convention. Then there is a second annex dealing with what in this country our communications companies are disposed to regard as managerial or operating functions. Such authorities are all grouped in this annex to which the United States is not a party, the United States adhering only to the terms of the convention and to the general regulations.

"I am fully persuaded that the delegates who represented the United States at this conference dealt with the subject matter with intelligence and with the utmost regard for the interests of the United States. I think we may safely ratify what they, under the guidance of our State Department, have worked out; and I concur in the hope of the Senator from Nevada (Mr. PITTMAN) that the treaty may have the approval of this body."

"Mr. DILL. Mr. President, I merely wish to say a word about the treaty. I had early in the session a considerable number of complaints from amateur radio operators and organizations of amateurs interested in radio, but the Senator from Nevada has explained that the hearings entirely satisfied these amateur radio complainants, as I understand."

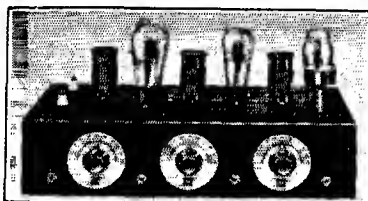
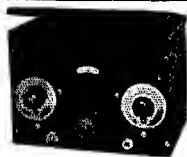
"Mr. PITTMAN. Mr. President, I cannot go so far, probably, as to say that it satisfied all of them, but those on the committee who were looking after their interests and caused the hearing to be had advised them that they thought the treaty afforded to them more protection than they ever previously had."

"Mr. DILL. I may say that since the hearings I have had no further complaint, so I take it that they are satisfied."

The "EAGLE" Three-Tube Short Wave Receiver

"Band Spread" over any portion of the tuning range — only finest material used thruout. Employs one '32 R.F., one '32 detector and one '33 Pentode Audio — 15 to 200 meters — four coils, supplied. The "EAGLE" is economical — two dry cells will operate the filaments. See March or April 1933 QST for full description of this most excellent value in short wave receivers.

"Eagle" completely wired and tested. **\$11.95** Three tubes tested in your receiver. **\$3.00**

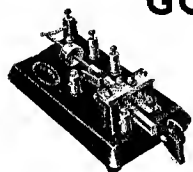


GROSS C C TRANSMITTER — OUTPUT 25-30 WATTS

The "CW-25" transmitter kit due to its low cost makes it possible for anyone to own a modern crystal controlled station. A schematic hook-up and parts layout sheet as well as tuning instructions are furnished, thus enabling the most inexperienced operator to wire and put the set on the air, for real results. The "CW-25" is supplied with a shrivel finished sturdy metal chassis under which all parts are mounted, making the wiring and components dustproof. A plug-in crystal holder is furnished with the kit. Only one milliammeter is required for tuning the transmitter and each stage is provided with a jack for this purpose. The "CW-25" uses one '47 as crystal oscillator, one '46 as buffer or doubler and two '46's in the amplifier stage, set of three coils supplied with kit for 20, 40, 80 or 160 band. **\$13.95**

Additional coils 75c each. Complete kit, less tubes and crystal.

GO-DEVIL



The new Mechanical Key Sensation. Has many features — will do anything the highest priced key will — Tungsten Contacts — come in and try it.

Price **\$6.00**

NEW!!

Gross Crystal Holder

WHITE CERAMIC commercial type crystal holder — priced at less than ordinary holders. Adjustable pressure, dust proof, no tools required to open. Takes crystal to 1 1/4" square. Plus standard 3/4" spacing. **\$1.00** Most efficient job yet...



CLASS B TRANSF. — 19 TUBES per pair **\$3.00**

GROSS SPECIAL TRANSFORMER

600 volts each side of C.T. 200 MA
2 1/2 V. 10 amps., 5 V. 3 amps.,
7 1/2 V. 3 amps. **\$3.39**

Cased Combination Filament Transformer

2 1/2 V. C.T. 10 amps for 866's
10 V. C.T. 7 amps for '50's or '52's
10000 volts insulation. **\$3.24**

FILAMENT TRANSFORMER FOR BRIDGE RECTIFIER

using 83 tubes 5 v-5 v-5 at 3 amps
C.T. — 3000 v insulation. **\$2.25**

GROSS CASED POWER TRANSFORMERS

650 v ea. side C.T. 350 ma fila. 2-7 1/2 v
C.T. and 1-5 v will give 500 v with
choke input using 83 or 5Z3 tubes. You
can run your entire R.F. and class B off
this trans. **\$5.50**

750 v ea. side C.T. 300 ma fila. 2-7 1/2 v
C.T. and 1-5 v. **\$5.75**
750-1000 v ea. side of C.T. 300 watts.
..... **\$6.65**

850-1350-1500 v ea. side of C.T. 400
watts. **\$8.70**
(the ideal job to give 750-1000-1250 v
D.C. with choke input)

850-1350-1500 v ea. side of C.T. 550
ma. **\$12.50**
1500-2000 v ea. side of C.T. 800 watts
..... **\$11.70**

Mounted Center Tapped Filament Transformers

2 1/2 v 8 a — 2 1/2 v 3 a — 5 v 3 a. **\$1.29**
2 1/2 v 4 a — 7 1/2 v 2 1/2 a — 7 1/2 v 2 1/2 a.
..... **\$1.29**

2 1/2 v 4 a — 5 v 3 a — 7 1/2 v 2 1/2 a. **1.29**
5 v 3 a — 7 1/2 v 2 1/2 a — 7 1/2 v 2 1/2 a. **1.29**
2 1/2 v 6 a — CT (midget). **.74**
5 v 3 a — CT (midget). **.74**
6.3 v 1.5 a — CT (midget). **.69**
7 1/2 v 3 a — CT (midget). **.89**

THORD. 15 H 250 MA choke. **\$2.95**
GROSS 30 H 200 MA cased choke. **1.94**
Cased 30 H 125 MA choke. **.95**

NEW!! GROSS 40 WATT PHONE & C.W. TRANSMITTER

Uses inexpensive '10's in Class B and Class C.

Write for data on this and other Gross transmitters

Filament Transformers shielded in metal cases, center tapped secondaries

2.5 Volt 10 amperes for 866's. **\$2.25**
10 to 12 Volts at 8 amperes. **2.25**
Special 10-12 Volt 7.5 ampere filament
transformer, extra special. **\$1.10**

Universal Antenna Coupling System Inductances

Wound on threaded double X natural bakelite tubing, can easily be tapped, with clip supplied, ea. **\$1.75**
(Use one coil for single-wire feed and two coils for two-wire systems)

Low C 40-80-160 Meter Amplifier Coils
(See transmitter by GRAMMER page 46 May QST) Plug-in, wound on threaded natural bakelite tubing, will tune with 50 or 75 mmf. condenser any size, each. **\$2.00**

GUARANTEED TUBES

866 tubes that carry our full guarantee — ISOLANTITE top — Heavy duty rectifiers. **\$1.45**

RAYTHEON RK-20

The New RF Pentode Power Amplifier
Tube in stock. **\$15.00**
(see page 14 June QST)

SPECIAL TUBES II

CARBON PLATE 203-A. **\$8.75**

888 or 871 Isolantite top. **.95**

81's. **.30**

1/4, 1/2 and 1 watt Neon Bulbs. **.35**

NEW TYPE RCA 801 Tubes. **\$5.75**

NEW TRANSMITTING KEYS Solid Coin Silver Contacts

Black shrivel cast base 1/4 K.W. contacts. **\$1.45**
Chrome cast base quarter inch contacts. **\$1.95**

EXTRA SPECIAL MOUNTED UNCASSED TRANSFORMERS

500-750-1000 volt each side of C.T. 300 watts. **\$5.50**
400-800 volts each side of C.T. 160 MA. **\$3.40**

A New Line of very Attractive Nickel Plated Cased Audio Transformers for Sub-Panels or Base Mounting Specially Priced

Double Button Mike to Grid. **\$1.45**
Mixing Carbon Mike Transformers
500 and 200 to 500 and 200 ohms. **1.75**
Single Plate to Push Pull Grid. **1.45**
Single Plate to Single Grid. **1.35**
Plate to 500-200 Ohm Line. **1.75**
Push Pull Plates to Push Pull Grids. **1.55**

Bliley BC2 Crystal Holders Now ... **\$1.00**
40-80 M BC3 Mounted Crystals. **3.95**
(stock or within 10 KC)

Ward Leonard Vitreous Resistors

8 1/2" long with variable sliders — will dissipate 200 watts.
1000 ohms. **.99**
2500 ohms. **1.05**
5000 ohms. **1.05**
10000 ohms. **1.11**
15000 ohms. **1.20**
25000 ohms. **1.29**
35000 ohms. **1.35**
50000 ohms. **1.44**
60000 ohms. **1.49**
80000 ohms. **1.59**
100000 ohms. **1.65**

Hoyt Antenna Meter

Hot wire antenna meters, 2 1/4" mounting hole, flange 3" diameter, supplied in 1/4, 3 and 5 ampere ranges. Why work without antenna meters when you can buy them at this special price? ... **\$2.95**
See August QST for MA and volt meters

20% deposit with all C.O.D. orders. Remit by M.O. Include postage

GROSS RADIO, INC.

51 VESEY STREET

NEW YORK CITY

CONDENSERS

FOR

High Frequency Circuits

FOR use in both receiving and transmitting circuits at high frequencies, General Radio condensers find wide application. G-R parts have been the choice of leading amateurs for years. Correctly designed, carefully manufactured and inspected, G-R condensers can be relied upon to give many years of service.



TYPE 368

Used in receiver and low-power transmitter circuits — hard rubber insulation — panel or baseboard mounting — small and rugged — three capacitance ranges: Maxi-

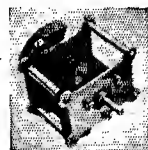
mum of 15 μf , 50 μf , 100 μf and priced at 75 cents to \$1.75.



TYPE 568

For receiver, frequency meter and low-power transmitters the Type 568 Condenser is widely used. Heavy construction — brass plates — cone

bearings — removable shaft of bakelite for ganging and isolating circuits — low resistance rotor contacts — Isolantite insulation. Type 568-D, 175 μf max. capacitance and Type 568-K 50 μf max. capacitance. Either type \$4.00.



TYPE 334

The standard amateur condenser for years. Soldered brass plates — hard rubber insulation placed in weak field — heavy end plates and tie rods — adequate bearing surface — made in a wide

range of capacitances in both 500 and 2500 volt types and as special "band-spread" units, either single or double-section.

Only several of the numerous General Radio condensers are briefly described here. For detailed information concerning the complete line of G-R condensers and other amateur experimental equipment write for Bulletin Q-9.

General Radio Company

30 State Street

CAMBRIDGE, A

MASSACHUSETTS

"Mr. PITTMAN. I think they are."

"Mr. DILL. Aside from that, I have had no objection, and I think, as the Senator from Maine has said, there is much to be said in favor of this convention."

"Mr. WHITE. Mr. President, will the Senator yield?"

"Mr. DILL. I yield to the Senator from Maine."

"Mr. WHITE. I, too, have had representations from amateurs with respect to this treaty. I recall that in 1927 the amateurs were greatly disturbed at that time as to the provision to be made for them in the then pending radio treaty. The delegates from the United States then did everything possible in behalf of the amateurs of this country. I also feel sure that our delegation did everything possible for them at this Madrid Convention. I am fully persuaded, Mr. President, that if it were not for the provisions inserted herein in their behalf, the amateurs of the world and the amateurs of America would have, so far as international correspondence goes, a very much more difficult time than they now face under the terms of this treaty. In other words, I think, as does the Senator from Nevada, that this is a shield and a protection to them in their international interests."

"Mr. DILL. That shield and that protection, however, come largely from foreign countries rather than from the Government of our own country. I think that the governments of foreign countries have been more unfriendly to amateurs, probably, than has our own Government."

"Mr. WHITE. I think the Senator is quite right, and when I refer to a 'shield and a protection' I mean that the United States has secured from foreign countries concessions in behalf of amateurs which could not be had except under the terms of this treaty."

"Mr. DILL. I feel that with the continued development, the enlarged development, in fact, of the use of the short wave the amateur's claim becomes even more worthy of consideration than when the number of frequencies available were fewer than they now are. Personally, I am strongly in favor of the ratification of the treaty."

"THE PRESIDING OFFICER. If there be no amendment, the convention will be reported to the Senate."

"The convention was reported to the Senate without amendment."

From the above it must be apparent that the editorial comment referred to is a distorted report of what actually took place. If there were any further remarks made on the floor of the Senate in relation to amateur protests, a most careful search on my part has failed to disclose them.

All I ask is that you, or any other amateur, compare the copy of the verbatim text, as given above, with the statements made in the column of "Radio" to which I have heretofore made reference, and I am confident that you, or they, will realize how distorted the statement made in "Radio" actually is. There has been entirely too much misrepresentation of facts concerning the Madrid Treaty, and it is time that the truth be known.

If I had not been following the course of legislative affairs at Washington so closely, as I have over a number of years beginning in 1911, I might hesitate to make these definite assertions, but I feel that I am in a position to speak authoritatively concerning them.

—Charles H. Stewart, W3ZS

Pirates on Ten?

141 Alton Ave., San Francisco, Calif.

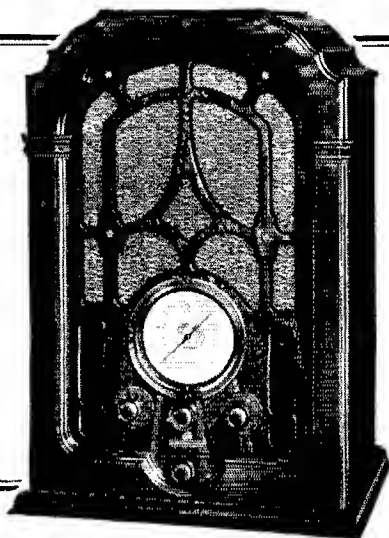
Editor, QST:

Is nothing sacred any more? Imagine my surprise upon returning home from a fishing trip

Simplicity can be overdone

THE SIMPLEST SHORT-WAVE SUPERHETERODYNE

Would have plug-in coils
would have multiple tuning control
would lack a speaker
would have a separate powerpack
would have a limited tuning range
would be *without pre-selection*.
It would be easy to make but—
would tend to be noisy
would be helpless against image interference.



THE GENERAL ELECTRIC K-80 ALL-PURPOSE RECEIVER IS NOT SO SIMPLE

IT HAS 2 *integral* stages of *inductively* coupled pre-selecting amplification to erase noises and images. **YOU HEAR STATIONS UNOBSURED BY THE USUAL IMAGES.** Admittedly, this requires a 4-section tuning condenser.

It has a single tuning control.

It has a noiseless 1-stage i. f. system and every other modern provision for noise-suppression, such as doublet-antenna facilities and complete shielding.

It has a wide-range automatic volume control. Input changes of 50,000 to 1 change the

output very little. The absence of images, and low noise, permit full a. v. c. operation.

It has a high-gain audio system, supplying up to 6 watts to an *integral* dynamic speaker.

It has super-fine tuning over a continuous range of from 550 kc. to 18,000 kc.

C. W.? Of course! See the coupon.

GENERAL  ELECTRIC
RADIO

GENERAL ELECTRIC COMPANY
Radio Sales Section, R-679, Bridgeport, Conn.

Kindly send me, without charge, full technical details of the K-80 receiver. My special interests are checked below.

☐ New receiver antenna data ☐ Using the K-80 for C. W.
☐ I do radio service work

Name.....

Street.....

City..... State.....

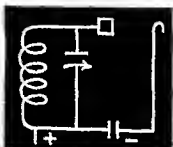


SPRAGUE
Short Wave

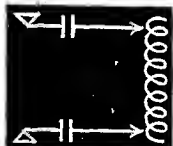


HIGH FREQUENCY BY-PASS CONDENSERS

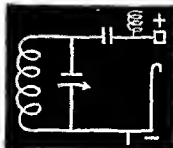
Cat. No.	Capacity	D.C. Working Voltage	Diam.	Length	List	Net
SW-22 .....	.002	1500	3/8"	by 1 3/4"	\$.45	\$.27
SW-25 .....	.005	1500	3/8"	by 1 3/4"	.45	.27
SW-11 .....	.01	1500	3/8"	by 1 3/4"	.70	.42
SW-15 .....	.05	1000	7/8"	by 2 1/4"	.80	.48
SW-1	0.1	1000	7/8"	by 2 1/4"	.90	.54



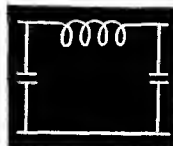
BY-PASS



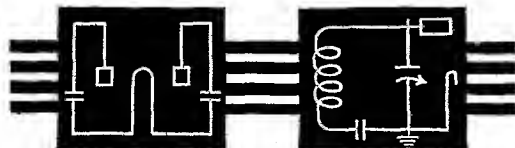
COUPLING (Ant.)



BLOCKING



FILTERS (Fone)



BUFFER (Hi-Mu Vapor Tubes)

GROUNDING ROTORS

ANOTHER Sprague development of utmost importance to every amateur and short wave fan. . . . Oil-impregnated Short Wave Condensers guaranteed as excellent substitutes for mica condensers in any of the circuits illustrated. And look at the prices! — from 50% to 75% less than you have paid for mica units.

Just the thing for by-pass purposes in Short Wave receivers, although they are not recommended as series padding condensers or as mica substitutes in tuned circuits. Thus, while not a universal substitute for mica, Sprague Short Wave Condensers CAN be used with entire safety and effectiveness in the circuits mentioned.

YOU JUST CAN'T BREAK THEM DOWN. TESTS AT HEAVY CURRENT AND TREMENDOUS HEAT HAVE SHOWN NO FAILURES. OIL CONDENSERS ARE ALWAYS BEST.

Sturdy — self-supporting. Unusually small — from one third to one half as large as mica condensers of the same ratings. Metal encased — non-inductive — extremely low power factor — impregnated with a specially developed oil — 1500 V. and 1000 V. continuous D. C. ratings. Guaranteed unconditionally when used as specified. Sold by leading jobbers. TRY THEM TODAY!

Write for our complete Condenser Catalog

SPRAGUE PRODUCTS CO.
North Adams, Mass.

last week to find two heard cards from Los Angeles reporting my 28-mc. signals on days when I was 270 miles from my transmitter! And to-day a third card came, again reporting my signals, and this time R8. I wouldn't care if I had never been on ten meters, but gosh, I've been plugging away there for three years, and believe me, I highly value the few reports and worked cards I have received. One of the fellows down south later worked this pirate using my call, and he says the culprit is using PP '10's and a SW-3 receiver. Imagine! after I've cut and cursed these many moons to get my crystal rig down there and to get a receiver that would work to my satisfaction, this fiend comes along and right off the bat starts being heard and working fellows!

It really wouldn't be bad, but the crowning ignominy is the fact that all his work is done in the evenings when there is the least possible chance for 28-mc. DX!

Here're a few points, OM: get crystal as soon as you can. Preferably about 28150, since mine is 28040, and I wouldn't want to QRM myself on the East Coast. Get on in the daytime, preferably week-ends, and listen closest when 14-mc. signals have great strength, or when the skip on 14 mc. is only about five or six hundred miles. Arrange your antenna preferably for low-angle radiation, but most anything will work. Tell any DX you work that you will QSL, and when I get their card I will be glad to send them one, because, after all, I am interested in whom I QSO. And finally, send as well as you can—I'd like to become an A-1 operator.

—Byron Goodman, W6CAL

International Contest Results

(Continued from page 46)

tion of it. A comparison, by W4MR: Getting a DX QSO through the solid wall of QRM and intense competition was like carving out a place to stand on the side of a solid wall of granite! W5AUC accomplished his aim—WAC. W6CXW made WAC in 3 3/4 hours on 7 mc. W6CVZ and W6ADP split operating time, but their scores are not to be sneezed at! The log book at W6EWC, and in many other shacks, we'll wager, looks like a call book after the contest. Not a single CQ left W6GTM; all QSOs resulted from station calls. W6EYC heard a long list of Europeans and Africans. The world at its worst: W6CQI's filter departed this life, and no radio store within 75 miles. W6AOD worked J2IN at 2:35 p.m. Pacific Time, March 12th—he asks which way the signals traveled?! We nominate for the "ham with the best sense of humor" W6DNY, who upon reporting a score of 3 remarked, "I attribute my great success to my great perseverance"! Found! The best time to operate: Immediately after a DX contest . . . when the active hams are in the arms of Morpheus recuperating from the encounter. W6BNH is located at a Hydro-Electric plant on the Stanislaus River, which cuts through a canyon with walls from 1500 to 2000 feet high; his signals have to make some jump before they start getting anywhere; and in receiving he has

INCREASED

Popularity

REMINISCENT of the moral pointed out in the saying that a path would be beaten to the door of the maker even of a better mouse trap, are some statements contained in a letter to an impatient customer, written by a distributor of CARDWELL condensers and later relayed to us.

"We have your letter . . . regarding our inability to ship Cardwell condensers. We wish to state that our stock has been completely depleted here owing to an extremely unheralded demand for these condensers — the reason being increased popularity . . . etc. We ask that you bear with us until this material comes in from the factory."

Whether it be mouse trap or variable condenser, a product will receive the recognition it merits, and "increased popularity" and "an extremely unheralded demand" are won only by superior quality and performance.

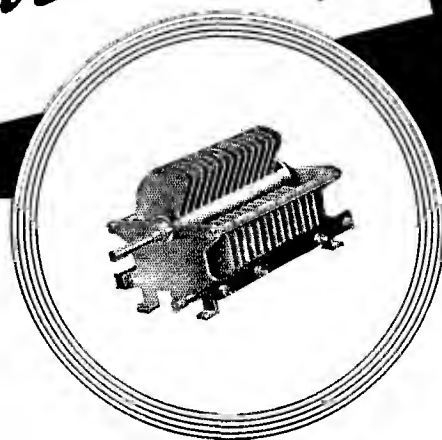
A new generation is discovering and appreciating in CARDWELL condensers virtues long known to engineers and Amateurs who pioneered where others now follow. Don't doubt it, the time-proven CARDWELL is your best bet.

Send for literature.

Any reliable supplier should cooperate with you to enable you to get what you want. He can get CARDWELLS for you if he does not keep them in stock. Get what you want — insist on CARDWELLS. Order direct from us if your dealer will not supply you, or let us tell you where you may buy.

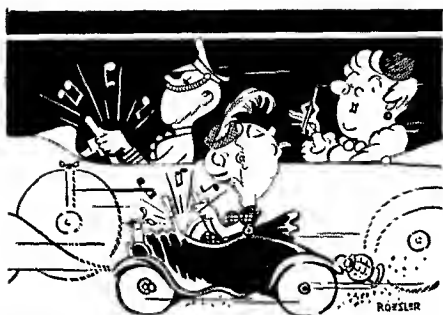
THE ALLEN D. CARDWELL MFG. CORP'N.
83 PROSPECT STREET, BROOKLYN, N. Y.

"THE STANDARD of COMPARISON"



CARDWELL "TRIM-AIR" MIDGET CONDENSERS
CARDWELL MIDWAY "FEATHERWEIGHT" CONDENSERS,
RECEIVING and TRANSMITTING
CARDWELL "STANDARD" MODELS FOR RECEIVERS
and MEDIUM POWER TRANSMITTERS
CARDWELL 16-B TRANSMITTING CONDENSERS
FOR LARGER TRANSMITTERS
CARDWELL HIGH VOLTAGE CONDENSERS
FOR COMMERCIAL RADIO-TELEGRAPH and
BROADCASTING STATIONS
CARDWELL S-2244 OIL DIELECTRIC FIXED CONDENSERS
FOR HIGH FREQUENCY FURNACES
and TUBE BOMBARDERS
THERE'S A CARDWELL FOR EVERY TUBE,
PURPOSE and POCKETBOOK



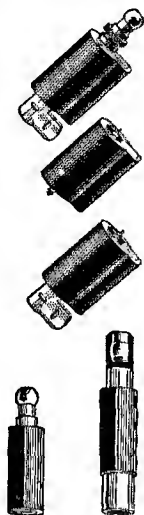
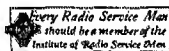


"The Colonel's Lady and Judy O'Grady"

may or may not be "daughters under the skin" . . . but its a sure bet that their auto radios function equally well . . . that is IF they are equipped with Centralab Suppressors.

For Centralab Suppressors work mighty well against the asthmatic wheezings of a decrepit collegiate car of early vintage . . . and they do a real job filtering out the umpty-umph horse-power impulses of a sixteen cylinder Rolls-nice.

**Central Radio
Laboratories**
MILWAUKEE, WIS.



Centralab

**MOTOR RADIO NOISE
SUPPRESSORS**

the many forms of QRM found around power houses; but he enjoys ham radio just the same! W6CLP found that 777 was the serial number used by each of the following: CM2OP, CM2JM, LU1CH, LU2FC, ZL2CI, VK4UU and VK5PK. . . . 852 was a popular number with the W's. W6AUT used his house number for a serial. W6KIP is ex-8JQ of the Spark Days, but still has plenty of ham pep to work DX. W6EXQ made WAC three times during the fray. High spots at W6QD: ZS2A rolling along working all districts on his bug. . . . J2GX complains of bad power leak or he could have done better. . . . ZL2CI, ZL4AI, ZL4AO playing tag jumping from one frequency to another trying to clean up the band . . . when one would change frequency, sure enough the other two would be there also. . . . The first J worked on 7 mc. by W6QD was J2IX, the YL operator of Japan, and a fine one, too. W6GWW spent more time calling ZS2A than in working all those listed in his contest log, and still he couldn't raise him! W6FZL found J signals the most consistently p.d.c. of all countries heard. W7DL needed an African for WAC . . . the contest did it! W7BB WAC'ed during the tests. To work four DX stations W7AYM made 79 calls! HC1LC was nearly R9 at W7JZ during the entire contest period. W8CJJ didn't call CQ once during the tests, but he worked them just the same. W8CRA worked 128 stations in 48 countries, all continents, raising his countries-QSO'ed total to 94. W8DWV heard 60 countries. W8CCW heard 62 countries in the first two days of the tests! W8DVX estimates he used nigh onto \$10 worth of gasoline running back and forth from the station to his work. W8BTI and W9CPQ WAC'ed three times! W8NV heard 174 stations in 44 countries; 42.5% of those called were worked. W8AYO dug a moral out of his experiences: "Be not dismayed when it seems your sigs are not getting out of the back yard, for thine hour will come in due season." Patience, me lads! W8BWB made WAC. W8HUD heard at least twenty-five chaps using 852 as a serial. W8AZD added ten new countries to his list. A contact with ZS2A made W8ANQ eligible for WAC. W8FAD on 7 mc. succeeded in raising only one station in each continent—except Asia; but he is satisfied: it meant two new continents. W8AAT heard all continents for the first time. W8CU heard 46 countries in four continents. Observations at W8ZY: Three VK's worked in succession with same serial, 777. . . . About 90% of all W stations seemed to be between 7000 and 7050 kcs. . . . Sewing machines should be equipped with interference eliminators, likewise automobiles. . . . A.R.R.L. should get a bonus from power companies. . . . Most satisfaction: Connecting D4BAR with a W6 on 7 mc. . . . Unusual: Working K6COG at Noon E.S.T. on 14 mc., and ZL4AI at 11:30 p.m. E.S.T. on 7 mc. . . . Hearing J2GX on 14 mc., R8! All continents were snagged at W9UM, W9FM, W9FLH, W9GYK, W9AZZ, W9FUM, W9RH, W9ELL and W9IJ. W9KA raised his countries worked to 42. Mrs. L. W. Mida, W9LW, is the

LEEDS ALWAYS LEADS

We are all set to anticipate the 1935 demand for accessories to match the new rack type receivers and transmitters that will be the sensation of the season

RACK PANELS

Last month we introduced our new relay racks. NOW we are pleased to present our line of rack panels in both aluminum and cold rolled steel in all sizes. The aluminum panels are ideal for light weight units where large holes are required. Steel panels for heavy units and power supplies. Both types have the same black crystalline finish, with standard mounting slots, 19" long and 1/8" thick.

Aluminum	Weight	Price	Width	Steel	Weight	Price
PA 1.....	2 lbs.	\$1.65	1 3/4	PS 1.....	2 lbs.	\$1.05
PA 2.....	3 lbs.	1.85	3 1/2	PS 2.....	4 lbs.	1.20
PA 3.....	3 lbs.	2.15	5 3/4	PS 3.....	6 lbs.	1.30
PA 4.....	4 lbs.	2.35	7	PS 4.....	7 lbs.	1.35
PA 5.....	5 lbs.	2.45	8 3/4	PS 5.....	8 lbs.	1.45
PA 6.....	6 lbs.	2.55	10 1/2	PS 6.....	10 lbs.	1.55
PA 7.....	7 lbs.	3.00	12 1/4	PS 7.....	11 lbs.	1.70

Remember MYCALEX is the only low loss insulation that can be sawed, drilled or tapped to fit your requirements. See our advertisement in August QST for complete description and prices.

LAST CALL for 2-inch Model No. 165 JEWELL METERS 0-1 amp. Our special price for the balance **\$3.95** still left.....

The New GENERAL RADIO 677-Y coil forms in stock. This new form is ideal for 160 coil or antenna impedance matching coil; 30 turns, 4 inch diameter; only.....**75c**

For 20-40-80 meter, type 677U. Each.....**50c**

SPECIAL — General Radio straight line frequency split stator condensers; single spaced; 175 mmf per section; 85 mmf effective capacity. Shipping weight 3 lbs. Special.....**\$1.25**

BE NONCHALANT—

when the R. I. strolls in to look things over — Have a LEEDS type 1-B Freqmonitor on your operating table — it will eliminate embarrassing questions and provide two useful services as well. Complete with 2 tubes and large calibration chart.

\$19.75

Complete kit **\$11.45**. Shipping weight 9 lbs.

May we recommend the WING Transceiver for mobile installation. A rugged cast aluminum box and quality parts insure satisfactory operation under the most difficult conditions. Price **\$16.50** — with tubes..... **18.25**

Navy Type Telegraph Key

List **\$3.60**. Navy knob — 1/8" Tungsten contacts. Only a few left at.....**\$1.15**
With regular knob..... **.95**
Leeds transmitting key, spec..... **.65**

A new line of tubes for the transmitting amateur. Type 866 heavy duty rectifier **\$1.50**. Type 250 — **\$1.20**. Type 281 — **\$1.10**. Type 210 — **\$1.15**. Type 210 HF is particularly suited for ultra high frequency work, as lava insulation is used internally and a ceramic base eliminates the losses encountered in molded base tubes.....**\$1.65**

LEEDS BLACK CRYSTALLINE FINISHED CANS

Made of 20-gauge steel with removable top and bottom covers. Sides are of one piece with the free corner welded. Top and bottom covers may be fastened tightly in place with screws for which holes are provided.

Type	Weight	Size	Price
		W H L	
C-1.....	4 lbs.	5 1/2 x 5 1/2 x 6	\$.70
C-2.....	5 lbs.	5 x 6 x 9	1.10
C-3.....	7 lbs.	8 x 7 x 10	1.45
C-4.....	11 lbs.	11 x 8 x 12	1.85

HOT OFF THE PRESS

Our new 10-page descriptive folder Bulletin No. 73. It contains complete information on all LEEDS equipment, together with our new line of accessories for "commercial type" construction. 5c in stamps brings this to you post haste.

BETTER YET!

A thin dime — a tenth part of a dollar, brings to you our Bulletin 73 together with an armful of valuable information from the nationally known manufacturers of the equipment you are interested in, together with our discount sheet. Don't forget the manufacturers' own bulletin is the final authority on any line of equipment.

NEW—

A nifty code practice oscillator for beginners. Our new C P O oscillator operates on two dry cells, using **\$1.75** a type 30 tube. Special.....

GUARDIAN KEYING RELAY

operates on 6 to 15 volts A.C. **\$3.30** or D.C. Special.....

Guardian Break-in D.P.D.T. Relay operates on 110v. A.C.....**\$4.50**

WESTERN ELECTRIC

Signal Corps Type P-11 head phones; never sold below \$7.60 a pair. Now at a typical LEEDS bargain price, **\$3.95** per pair, of only.....

Our new cased easy mounting audio transformers fill every amateur requirement. All the dope with new low prices in our Bulletin No. 73.

DON'T BE FOOLED

by catalogs announcing "prices slashed" that end up by giving you the conventional 40% and 2% discount to which you are entitled. As a QST advertiser we sell standard merchandise as low as anyone. Furthermore we have it in stock.



45 Vesey Street, New York City

New York Headquarters for Transmitting Apparatus and Short Wave Equipment

To our oversea customers — many thanks, not only for the orders you have sent us, but also for spreading the news that "Get it from LEEDS" means fast, accurate service, with free export packing at the same prices American amateurs pay.

To OUR READERS who are not A.R.R.L. Members

YOU should become a member of the League! That you are interested in amateur radio is shown by your reading of *QST*. From it you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on the page opposite the editorial page of this issue. We should like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio. You will have *QST* delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

A bona fide interest in amateur radio is the only essential qualification for membership

AMERICAN RADIO RELAY LEAGUE
West Hartford, Conn., U. S. A.

I hereby apply for membership in the American Radio Relay League, and enclose \$2.50 (\$3.00 outside of the United States and its Possessions, and Canada) in payment of one year's dues, \$1.25 of which is for a subscription to *QST* for the same period. Please begin my subscription with the issue. Mail my Certificate of Membership and send *QST* to the following name and address.

.....
.....
.....

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may send him a sample copy of *QST*?

.....
Thanks

highest scoring YF operator. W9JO heard 41 different countries. Losses? Everyone had 'em. W9DFY lost ten pounds, the friendliness of his YF, \$4.00 on bets, and a perfectly good milliammeter. W9AUH landed a J, something he had been trying to do for eight long years. W9GYL's list of calls heard is an inspiration for anyone. W9DQD chose the serial number 321 because the first ZL he ever worked was a 3, the second a 2, the third a 1. In the 1933 tests he took his number the same way from the first three VKs worked. W9GBJ started the contest using the same \$65 '10 that he used in the Sweepstakes! Then half way through the contest his YF presented him with a new 800 . . . nice YF! W9CYA didn't have to ask for any repeats in numbers, nor did any of the stations worked by him! W9IH didn't send a single CQ throughout the whole contest. CE7AA is recommended as one of the best operators in the tests by W9IH. W9FYU worked all continents twice. W9BIB can now boast WAC, thanks to J2GY. 80% of the stations heard at W9ELL were worked. W9GDH worked all continents twice, within twenty hours, and added five new countries, his total 62. W9CPQ worked all continents in eight hours, and his total countries worked was boosted to 42. W9DHM heard 45 countries. The serial numbers heard the most by W9FO were 222 and 777 (six stations each). VE1EP added two new countries. VE2AX took a week of his vacation to participate. VE2HG made over 200 calls for his 13 QSOs, but didn't call a single CQ. VE3WA heard J2IN on 14 mc. from 4 to 6 p.m. E.S.T.

—E. L. B.

Field Day Results

(Continued from page 36)

The Starved Rock Radio Club, W9IEP-W9NIU, made a mad dash 350 miles north to Bear Lake, Michigan. Got a great kick hearing W9MKS, another portable from our own club. Hope to have R9 sig. everywhere next year.

W6DAN (A1) and W6EFK (MB) kept W6FFC on the air in a small cottage at San Diego. Eagerly looking forward to the next. In these days of high power the Field-Days are refreshing. Operating ability was stressed, and it was great fun. W1AWY and W1BLZ were at Holbrook Pond, East Holden, Me.

Ludington Amateur Radio Association: CA, PLO, HG, RO, BO, JM and TP all operated W8HXT. Mosquitoes were bad! A generous supply of Flit helped. Maybe it oiled up several wrists as well!—W8IFQ.

—F. E. H.

Typical Technical Questions

(Continued from page 38)

will be the maximum capacity of the condenser plus that portion of the minimum capacity contributed by the circuit. Thus the maximum capacity will be 165 μfd . This gives a capacity ratio, minimum to maximum, of 5.5 to 1. Taking the square root of this ratio gives a frequency

The Newest Member of a Distinguished Family

COLLINS 30FXB

A radiophone and telegraph transmitter embodying the latest refinements and developments of the past six months. The 30FXB meets all the requirements of a modern installation — plenty of power, high fidelity, and multiband operation without neutralization adjustment. Installation is simplicity itself — merely connect antenna, power, key and microphone, and you are "on the air."

Completely Self Contained

TECHNICAL DATA

POWER OUTPUT — 100 watts nominal rating (203A).

FREQUENCY RANGE — 1500 to 15,000 kc. (standard)
New isolantite coil forms are used.

FREQUENCY CONTROL — Crystal oscillator with isolation of oscillator from amplifier by a buffer stage.

POWER SUPPLIES — 1000 and 1250 volts at 400 MA DC for modulators and power amplifier. 400 volts DC for crystal and buffer.

MODULATOR — Two 830B or 203A tubes are used in Class B.

FIXED NEUTRALIZATION — All neutralization adjustments in the 30FXB Transmitter are fixed at the factory so that the user does not have to do any balancing of the various circuits. Shifting from one band to another is merely a matter of changing the plug-in coils and setting the dials to the calibrated position.

SPEECH AMPLIFIER — The 7C Speech Amplifier designed primarily for use with a crystal microphone is furnished as an integral part of the 30FXB Transmitter. Thus, no external apparatus, except the microphone and telegraph key, is required and the installation is neat, self-contained and compact.

ANTENNA TUNING — The 2C pi Section Antenna Matching Network is furnished as standard equipment. This provision makes it possible to connect the 30FXB to any available antenna and to accomplish efficient energy transfer with proper attenuation of harmonics.

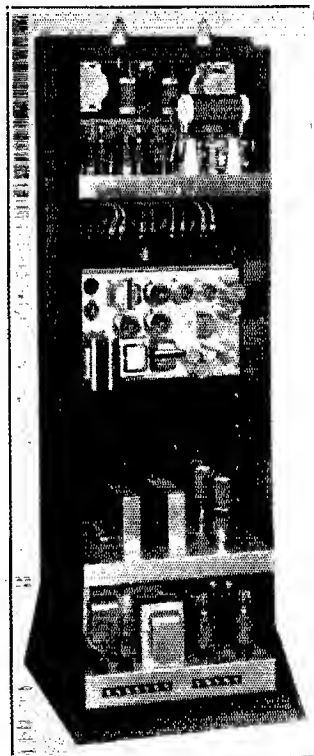
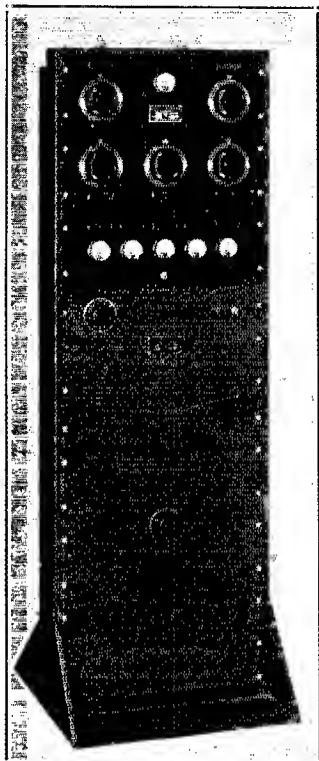
DIMENSIONS — 60" high, 20 1/4" wide, 20" deep.

SURPRISINGLY LOW PRICED
WRITE FOR FULL INFORMATION

COLLINS RADIO COMPANY

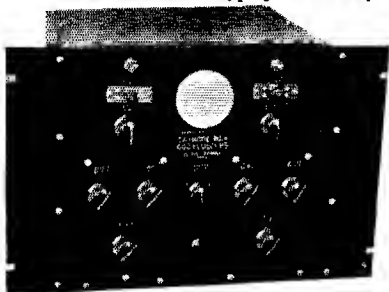
CEDAR RAPIDS  IOWA, U. S. A.

New York Office — 136 Liberty Street, N. Y. C.



THE IMPROVED CATHODE-RAY OSCILLOSCOPE

Linear sweep model for broadcast stations and advanced amateurs, physics labs., etc.



● Controlled linear sweep 0-150,000 C.P.S. ● Controlled external sweep. ● Freq. locking device for sweep frequency. ● Picture centering adjustments. ● Wide range focus adjustments. ● Complete component shielding. ● Unit is self contained and includes batteries and 110V-60 cycle power supply. ● Tubes RCA 906-885-234-281-280. ● This instrument embodies all features ordinarily contained in only the highest priced Cathode Ray equipment.

COMPLETELY EQUIPPED READY TO USE
F.O.B. Newark—\$97.50

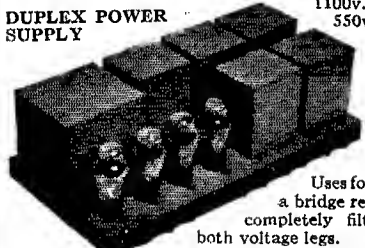
Billie Crystals—New Reduced Prices

BC-3 mounted crystal in holder, 80- and 40-meter band **\$3.95**

RK-20's in stock.....\$15.00

DUPLEX POWER
SUPPLY

1100v. 250 ma.
550v. 250ma.



Uses four 83's in a bridge rectifier—completely filtered in both voltage legs.

\$35.00

These units can be had on special order in any size mounting or form

PLATE TRANSFORMER — two 7½ and two 2½ volt fil. windings — 750-750-160 mls.\$3.50

Due to Demand, We are
Forced to Repeat Our August Sale
The prices now extended to Sept. 30th

K&R 15W-210's\$1.00

K&R 281.....\$1.00
K&R 250.....1.00
Pigtail resistors R.M.A. 1-Watt — 12 for.....1.00
16 henry—100 ma filter chokes.....1.00
C.C.A. 8 mfd—450V — Electrolytic Condenser, 2 for.....1.00
3-wire shielded mike cable — 21 ft.....1.00
No. 12 Enamel wire, 200 ft.....1.00
Comp. fil. trans., 2½V-3A-7½V-3A.....1.00
5" Glassinsulators, 12 for.....1.00
4, 5, 6, 7-prong coil forms, 8 for.....1.00
58 tubes shields, 10 for.....1.00
Transposition blocks, 12 for.....1.00
Jacks — all types, 10 for.....1.00
500 ma 5 Pi R.F. choke.....1.00
K&R 866 HD.....1.35

We are specializing in transmitter construction to customers' orders and specification. Write for quotation on your favorite transmitter.

Special code classes for beginners. No charge. Telephone for appointment.

KALTMAN & ROMANDER
62 Court St. Newark, N. J.

ratio of 1 to 2.35. If the lowest frequency to which the circuit will tune with a given coil is 1000 kc., the highest frequency to which it will tune will be approximately 2.35 times this value, or 2350 kc. In transmitter circuits, the minimum circuit and condenser capacities will usually run much higher, 75 to 100 μ fd. being typical. The frequency range covered will be reduced correspondingly.

— D. H. M.

Standard Frequency Transmissions

Date	Schedule	Frequency	Date	Schedule	Frequency
Sept. 5	BB	W9XAN	Oct. 3	BB	W9XAN
Sept. 7	BB	W6XK	Oct. 5	BB	W6XK
	A	W9XAN		A	W9XAN
Sept. 8	BX	W6XK	Oct. 6	BX	W6XK
Sept. 9	C	W6XK	Oct. 7	C	W6XK
Sept. 14	A	W6XK	Oct. 12	A	W6XK
Sept. 21	B	W9XAN	Oct. 19	B	W9XAN
	B	W6XK		B	W6XK
Sept. 26	C	W9XAN	Oct. 24	C	W9XAN
Sept. 28	B	W9XAN	Oct. 26	B	W9XAN
	A	W6XK		A	W6XK
			Oct. 31	BB	W9XAN

STANDARD FREQUENCY SCHEDULES

Time (p.m.)	Sched. and Freq. (kc.) A	B	Time (p.m.)	Sched. and Freq. (kc.) BB	C
8:00	3500	7000	4:00	7000	14,000
8:08	3600	7100	4:08	7100	14,100
8:16	3700	7200	4:16	7200	14,200
8:24	3800	7300	4:24	7300	14,300
8:32	3900		4:32		14,400
8:40	4000				

Time (a.m.)

Sched. & Freq. (kc.) BX

6:00 7000
6:08 7100
6:16 7200
6:24 7300

The time specified in the schedules is local standard time at the transmitting station. W9XAN uses Central Standard Time, and W6XK, Pacific Standard Time.

TRANSMITTING PROCEDURE

The time allotted to each transmission is 8 minutes divided as follows:

2 minutes—QST QST QST de (station call letters).
3 minutes—Characteristic letter of station followed by call letters and statement of frequency. The characteristic letter of W9XAN is "O"; and that of W6XK is "M."
1 minute—Statement of frequency in kilocycles and announcement of next frequency.
2 minutes—Time allowed to change to next frequency.
W9XAN: Elgin Observatory, Elgin National Watch Company, Elgin, Ill., Frank D. Urie in charge.
W6XK: Don Lee Broadcasting System, Los Angeles, Calif., Harold Peery in charge.

WWV 5000-Kc. Transmissions

The 5000-kc. transmissions of the Bureau of Standards' station, WWV, are given every Tuesday continuously from 12:00 noon to 2:00 p.m., and from 10:00 p.m. to midnight, E.S.T. These transmissions are accurate to ½ cycle (one in ten million).
— J. J. L.

THE LATEST AND THE BEST

The latest edition (11th edition, published January, 1934) is approximately 50% larger than the first edition, and represents probably the most comprehensive revision yet attempted. Seven chapters have been re-written entirely and the remaining ones re-arranged and revised so completely that the edition bears little resemblance to its predecessors. New receiver circuits and designs are presented, together with a thorough treatment of the recently-developed "single-signal" sets. A completely re-written 36-page chapter is devoted to all that is new in the world of transmitters. New circuits and layouts are given, all problems which face the transmitting amateur being discussed in a lucid and comprehensive manner. The radiotelephony chapter represents all new material. New designs for Class B modulators and speech amplifiers are featured; new and simple methods of determining the right operating conditions for any modulator are included. Still another new chapter is that on antennas.

Containing a wealth of fresh data on radiators and feeder systems it is the most comprehensive treatment of the amateur station antenna in existence. All other chapters have had their share of attention to bring the book up to the minute. Even the power supply section has been revamped from first to last with new designs, circuits and explanations being added.

● Each chapter occupies from six to thirty-six pages — indicating the thoroughness with which each subject is treated. In addition there is an appendix containing a fund of useful data. Then there is an index of several pages, by which the valuable information is made available more easily. This particularly important feature has been compiled and cross-indexed with great care and thought. ● In wealth of treatment and profusity of illustration the HANDBOOK is a big book. Printed in usual textbook style it would bulk double the number of pages and cost at least four times as much, but its publication in the familiar QST size makes for economy and enables distribution at a very moderate cost.

223 ILLUSTRATIONS
260 PAGES, 6½ X 9½

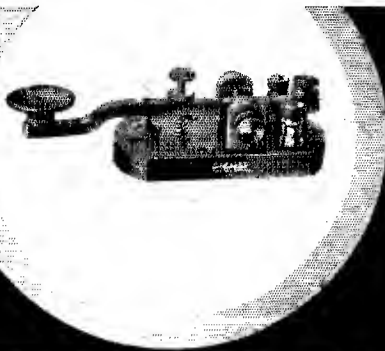
PRICE

\$1

POSTPAID

THE RADIO AMATEUR'S HANDBOOK

AMERICAN RADIO RELAY LEAGUE, WEST HARTFORD, CONN.



WIRELESS and TELEGRAPH INSTRUMENTS

Signal Wireless Keys and Wireless Practice Sets and Telegraph Instruments are built to scientific specifications — and are used by amateurs and commercial operators the world over. Lasting quality. Low prices. Send for circular showing the complete Signal line.

SIGNAL ELECTRIC MFG. CO.
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OFFICES IN PRINCIPAL CITIES

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MIDGET RELAY PROTECTION

against
OVERLOAD — UNDERLOAD



Send for full information about these two new and useful items. Learn how they are hooked in, how they operate, and the advantage they offer in amateur transmission. Also send for **FREE** bulletin 507 telling about other handy Ward Leonard Radio Products.

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Please send information about overload and underload relays free bulletin 507.

Name
Street
City and State
Call Signal

78

Say You Saw It in *QST* — It Identifies You and Helps *QST*

Silent Keys

It is with deep regret that we record the passing of these amateurs:

James Castoro, W2HFR, Fort Lee, N. J.
J. E. Depenbrock, W9ETD, Ludlow, Ky.
Lloyd B. Flood, W5DEY, Tulsa, Okla.
Mason Howell, W5AEL, Dallas, Texas
John C. Hunter, W9RGI, Cedar Rapids, Iowa
L. B. Moore, Sr., W4BKV, Tallahassee, Fla.
Otto H. Prill, W9AVB, Chicago, Ill.
Earl N. Richins, W6JXU, Henefer, Utah
Frank Wierzbicki, W8HGR, Lockport, N. Y.

Design of the Voltage Divider

(Continued from page 22)

condenser or other component whose operation may be impaired by heat. Likewise, the resistors should be kept away from wood or other material which might char or even catch fire. It is a good idea to mount the units on the supporting clamps with which resistors of this type are usually equipped.

Another point to remember is that the voltages designated for the various taps will be obtained only when the current values are as specified. Although current values deviating moderately from those intended may be tolerated, it is advisable to calculate in advance, as accurately as possible, the actual current that will be required at each tap when the power supply unit is placed in operation. The plate voltage and current ratings of the tubes which are to be supplied from the divider provide the proper basis for this preliminary.

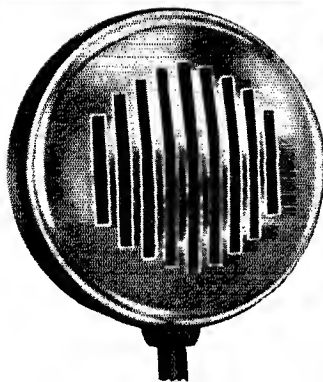
—J. J. L.

I.A.R.U. News

(Continued from page 47)

two hours with three watts input! At the time he was in the vicinity of Oslo Amateurs travelling past the Azores (steamers of the Cosulich and other lines always stop there) are cordially invited to drop in on H. J. Smith, CT2BK, at Rua do Pedro Homem 63, Ponta Delgada, S. Miguel, for a visit — a welcome is assured New members of the TBTOC Club: Roy C. Corderman, W3ZD, and H. T. Tuin, PA0DC; E. H. Fritschel, W2DC, also achieved his membership with the aid of PA0DC Latest QSL addresses: for Roumania, Radio Club Craiova, Dr. Alexander Savopol, YP5AS, Pres., Str. Rosetti 6, Craiova, Roumania; for Uruguay, Uruguayan Short Wave Code Gang, Box 37, Montevideo, Uruguay

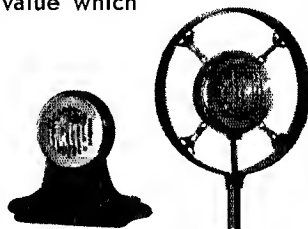
Sweeping the Country The TURNER CRYSTAL MICROPHONE



The Turner Type G Crystal Mike lists at \$20.00. Net to amateur, \$13.72. If your jobber is not yet supplied, send order direct. Money will be refunded if the instrument is not entirely satisfactory.

Since its recent announcement to the amateur trade, the new Turner Crystal Microphone (Brush Patents) has been accorded an enthusiastic welcome. The better amateur stations from coast to coast have been quick to appreciate the extraordinary microphone value which it offers.

Now at moderate cost you can enjoy the finest microphone performance. Exceptionally flat frequency response and no carbon hiss to spoil your signals. Requires no energizing current. Unusually strong and durable.



The Turner Type G is arranged for either spring or base mounting. Prices on either type mounting quoted on request.

SEND FOR FREE CIRCULAR

THE TURNER COMPANY-CEDAR RAPIDS, IA.

JACOBS SEPARATOR

U. S. Patent No. 1,950,179 — March 6, 1934

The logical Spreeder for the rapid, efficient and durable construction of 2 wire radio frequency feedlines used in conjunction with Hertz antenna systems. Made of polished, hard rubber they provide 6" separation, and the job of constructing a feedline is cut down to a fraction of the time required by the methods now in use. \$3.00 per dozen.

CHARLES F. JACOBS (W2EM) 270 Lafayette St., New York.

Mercury Thermostats for Crystal Ovens

Accurately calibrated to operate at 100 degrees Fahrenheit. Wholesale price to amateurs \$3.95 postpaid upon receipt of M.O.

Canady Recording Lamps for motion picture sound recording

In use all over the world. Latest type \$15.00 Net.

CANADY SOUND APPLIANCE CO.

19570 So. Sagamore Road Rocky River P. O., Cleveland, Ohio

Technical Training Station

Phone

C. W.



Studio Technique Guaranteed

K P A C

500-Watt 1260
Kilocycles

IN 3 to 7 months we train you to secure Commercial Telegraph Second-class, and Radiotelephone First-class government licenses. Course consists of Wireless Code, Radiophone, Microphone-Studio Technique, Service, Police, and Aeronautical Radio. We are authorized to teach RCA texts. At completion of course you receive practical studio technique experience in our commercial broadcast studios located in administration building, and experience as an operator on K-P-A-C (500-Watt Commercial transmitter located on the campus and owned and operated by the college), and WPA, 4000-Watt Commercial Wireless Station. Return coupon for details.

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Port Arthur (world-known port) Texas

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CALLS HEARD

THOUSANDS OF THEM FROM ALL OVER
THE WORLD!

How well are YOU getting out?

New lists are published each month from Asia, Africa, Europe, Oceania, North and South America.

CALLS HEARD not only tells you that you have been heard in these continents from month to month, but it tells you how WELL you were received—BOTH QSA and R RATINGS ARE GIVEN ON EVERY CALL!

CALLS HEARD covers all Amateur bands from 1.75 mc. to 28 mc., and tells you the exact time and frequency to use for QSO with any continent.

CALLS HEARD will send you a QSL card verifying the reception of your signals each time your call appears in the lists.

CALLS HEARD MAGAZINE guarantees to add new thrills and pleasures to the finest of all sports—Amateur radio. It's a big twenty cents worth, Gang. Twelve issues of CALLS HEARD MAGAZINE are yours for \$2.00, or six months for \$1.20. The foreign rate is \$2.50 a year. Subscribe now and keep your files complete. You'll regret it if you don't.

CALLS HEARD MAGAZINE, INC.
Winston-Salem, N. C.

Edited by W4CTO, ex9ABC, 9EN, 7UW

*Due to the highly specialized nature of this
magazine it will not be available
at newsstands*



SANGAMO ACCURATE CONDENSERS

Available in 5000 volt construction
for use in short wave transmitters

Write for catalog sheet

SANGAMO ELECTRIC CO.
SPRINGFIELD, ILLINOIS

The Simple Solution of Break-In

(Continued from page 20)

"underload circuit breaker," would open, thereby automatically shutting off all plate voltage and bringing succor to the scene in the nick of time. Also, should the switch accidentally be closed before the filament switch, the plate voltage would not be applied until the "circuit breaker" closed, which in practice gives the tube filaments about a three-second jump on the plate voltage. This, as any clever rascal can see, is far better than no jump at all.

Thus it is that all conditions for extremely satisfactory break-in operation with crystal control are very easily fulfilled with a little thought and logical application of the result. The monologue QSO is dying a slow death but a sure one, and why any attempt should be made to prolong its life under present conditions is a mystery. Each part of an amateur station should operate in coordination with every other part, and this cannot be accomplished when the transmitter and receiver are getting in each other's way.

MORE KINKS

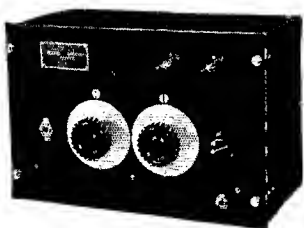
There are one or two other features incorporated in the installation here that, while they have nothing particular to do with break-in operation, might be worth mentioning.

One, is the use of protective fuses in the secondary of every power transformer. Flashlight bulbs are a lot cheaper than tubes, meters, and transformers, and it's an ancient stunt. If one gets a peek at the cartons the bulbs come in, they may be chosen by current ratings at which they will burn brilliantly (which ratings, by the way, have nothing to do with their voltage ratings—unless one knows the make as well). And they burn out at a bit more than rated current. Both Westinghouse and G. E. print the current consumption of their bulbs on the small cartons, and three handy ratings are 0.150 amp., 0.300 amp., and 0.5 amp. When screwed into miniature porcelain sockets, the voltage they will stand after blowing is both remarkable and most gratifying. Such fusing for the occasion is well worth the time and cost of installation, many, many times over—and completely repaid the first time one blows. For example, this type of fuse rated at 150 ma. is shown connected in the center tap of the grid-bias unit transformer. Don't worry—if a filter condenser shorts out the instantaneous plate current is well over that.

The next trick was described in March 1933 QST, and consists of bridge rectification of high voltage with low-voltage mercury vapor tubes. Instead of using three 83's, two 82's and an 83 are used with fine results. This still allows a current rating of 250 ma., since the 82 plates are in parallel; and it doesn't call for so many 5-volt windings on a transformer. With an r.m.s. voltage of 1250 from the plate transformer (using 750 volts on one side of the center tap and 500 on the other, the center tap being cheerfully ignored, of course), there is a voltage peak of 1750, which

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56-60 MC. RECEIVER



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Uses a 76, a 36 and a 41. Requires 6.3V AC or DC for fil. 135 V for "B" supply. Equipped with volume control and on-off switch.

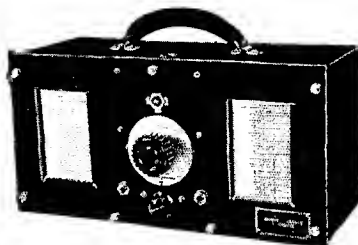
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allows four 8- μ fd. electrolytic condensers to be used in series in the filter, giving a total capacity of 2 μ fd. For anyone who is suddenly presented with one of the new high-voltage low-current tubes, or who is wondering how he is going to get any power out of his 211 without investing in a pair of 66's and a transformer when he already has one giving 500 to 750 volts either side of the center tap, this is pretty much what the doctor ordered.

So there we have crystal control, break-in and moderate power, all without a great deal of labor or expense. Could any reasonable ham want more at one sitting?

Automatic V.T. Regulation Control

(Continued from page 37)

must be used to maintain an equivalent regulation. The number of tubes which must be used in parallel, at any given voltage, will depend on the regulation desired, and also on the amount of load current. Probably a safe value of average plate current per tube used in the regulator would be 40 ma.

A single 2A3 is more than the equal of two 45's in parallel; in fact two 2A3's in parallel are the equal of five 45's in parallel. But as 2A3's cost several times what 45's do, on the basis of tube costs it is preferable to use 45's.

As the output voltage is lowered, it may be seen that it becomes necessary to increase the number of tubes in parallel to maintain good regulation, so that at low voltages it would be preferable to use batteries for bias, rather than an a.c. supply with this type of regulator.

The value of the resistor R_1 is not critical, so long as it is large enough to maintain the current drawn from the power supply at a very low value. Any value from a few hundred thousand ohms up to several megohms is satisfactory. The voltage divider R_2 can have practically any value, from a few thousand ohms up, as the current drawn is practically zero.

This type of power supply may also be used to supply grid bias to a Class-C stage, and has the advantage over using an unstabilized power supply, or a grid leak, in that the grid voltage will remain constant regardless of the value of grid current.

FOR PLATE POWER SUPPLIES

This type of regulator may also be used to keep the output voltage of a plate power supply constant, particularly to supply power to a variable load such as the plate circuit of a Class-B audio stage. The circuit used is the same as that used to stabilize the C-bias supply, except that the value of R_1 is reduced so that the current through the regulator tubes with no external load connected is at least equal to the maximum average current which will be supplied to the load.

When a load is connected, the current through



QST TO ALL HAMS

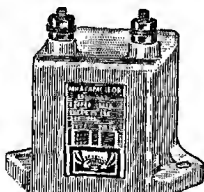
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	Exact Frq. \pm 1Kc	\pm 5Kc	\pm 10Kc	
7.0, 3.5	\$7.50	\$5.90	\$4.90	\$3.95
1.7	8.40	6.80	5.80	4.80

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the resistor R_1 will tend to increase. This will cause an increase in the bias of the regulator tube, which will decrease the current through it so that as the positive load current is increased the regulator current is decreased, thereby maintaining the load on the power supply practically constant, regardless of the load current. Fig. 3 shows the stabilized and unstabilized load curves for a power supply employing a Type 80 tube and a single-section filter with condenser input. In this case, the bias resistor was adjusted so that the current through the regulator tubes on no load was 60 milliamperes. This required a value of about 700 ohms for R_1 . Curves are shown for a single tube and for two tubes in parallel. It may be seen that the regulation is practically the same for either the single tube or two in parallel, indicating that the number of tubes which must be used in parallel will depend solely on the peak load current. It might be advantageous to place a filter condenser across the output of the regulator, to take care of the peak current demands, and thereby reduce the maximum value of current which will be drawn from the regulator.

APPENDIX

$$I_p = K \left(E_g + \frac{E_p}{\mu} \right)^{3/2} \quad (1)$$

where I_p = plate current

K = a constant

E_g = grid voltage

μ = amplification factor = 3.5 for the Type 45.

For a desired terminal voltage of 200 volts, cut-off bias voltage is:

$$\frac{E_p}{\mu} = \frac{200}{3.5} = 57.2 \text{ volts (negative)}$$

$$E_p = 257.2 + E_g$$

$$-E_g = 257.2 - E_p$$

$$E_p = \left[\left(\frac{I_p}{K} \right)^{2/3} + 257.2 - E_p \right] \mu$$

Substituting representative values in Equation (1),

$$K = 0.000614 \text{ for two Type 45's in parallel}$$

and

$$E_p = 0.777 \left[\left(\frac{I_p}{0.000614} \right)^{2/3} + 275.2 \right]$$

The Convention Season

(Continued from page 28)

auditorium of the Naval Armory—and that's some bunch of hams!

The proceedings started off with a virile address of welcome by the mayor of Perth Amboy, augmented by remarks on the part of the president of the Chamber of Commerce. Then Henry J. Kelley, president of the T.C.R.A. and hamfest general chairman, made a brief opening speech. (One of the best features of this hamfest, as a matter of fact, was the brevity of all the speeches.) The Nomads, a musical group of hams (we were

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Tubes — *RK-24 . . .	1.75	Tubes	1.68
Type 33	1.26		

*RK-24 originally designed for army use, replaces type 30 and gives two to three times more power output with the same plate voltage.

MT-5 Pickard type coil for 56 MC. operation \$1.50

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TRANSMITTERS — Type MO-71 with 2-3 watts output and Type MO-45 with 8-10 watts output. Both types are class B modulated and mounted on 17" black lacquer chassis. Either unit wired and tested for 56 MC. complete with tubes \$29.50

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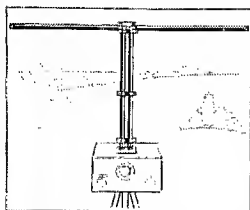
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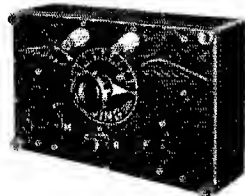
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about to say a ham musical group, but that wasn't the case at all), offered some brief introductory music, followed by Walter Jablon of Hammarlund in a technical talk. De Soto, of Headquarters, discussed the international situation.

The club contest, with representatives of the associated clubs as contestants, was a high spot of the evening. Parts for an emergency Hartley transmitter using a Type '30 tube and powered with two B batteries were given each contestant in a well-wrapped package. The one who first lit a flashlight bulb in a loop of wire with his assembled transmitter won—and the job was done in something like eight minutes. It was a remarkable spectacle; the first time this reporter, at least, has seen a ham use his teeth as well as his hands in building a radio set, for example.

Following a talk by Mr. Bailey of Cornell-Dubilier, there were more contests for the 'phone and c.w. men. The long-winded 'phone men were required to blow balloons until they burst, the first "bang" acclaiming the winner. The rag-chewing c.w. men "ate" strips of cloth several feet long depending from a central rod. After this, Dr. Haigis discussed his transceiver in impromptu fashion, the Nomads inserted incidental music while a man pounded himself with a couple of pairs of spoons in ratchety rhythm, and John Reinartz took another thousand people with him to the far North along with MacMillan and Byrd. The program wound up with remarks by Director Fuld and local A.R.R.L. field officials.

Then the free beer . . . Lord, but it took a long while to trickle a thousand thirsty hams past that bar . . . sandwiches . . . rag chewing (without the rags, this time) . . . and home in the smallest of the wee hours. Gargantuan, this hamfest, and good.

—C. B. D.

Louisiana State Convention

(Delta Division)

New Inn Hotel, Shreveport, La.,
Sept. 1st-2nd

THE Shreveport Radio Club extends a cordial invitation to all Louisiana radio amateurs to come to the annual state convention. Registration fee is \$1.00 if tickets are purchased by August 26th; after that date rates will be \$1.50 for men and \$1.00 for the ladies. The tickets will take care of your admittance for contests, banquet, prizes and other interesting parts of the convention. Further information from Claude E. Gardner, President, Box 1076, Shreveport, La.

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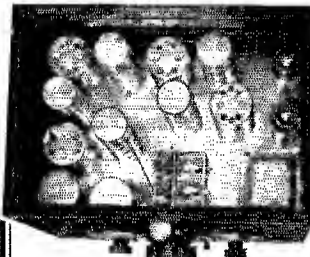
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—insigne of the radio amateur

IN the January, 1920, issue of QST there appeared an editorial requesting suggestions for the design of an A.R.R.L. emblem—a device whereby every amateur could know his brother amateur when they met, an insignia he could wear proudly wherever he went. There was need for such a device. The post-war boom of amateur radio brought thousands of new amateurs on the air, many of whom were neighbors but did not know each other. In the July, 1920, issue the design was announced—the familiar diamond that greets you at the top of this page—adopted by the Board of Directors at its annual meeting. It met with universal acceptance and use. For fourteen years it has been the unchallenged emblem of amateur radio, found wherever amateurs gathered, a symbol of the traditional greatness of that thing which we call Amateur Spirit—treasured, revered, idealized.



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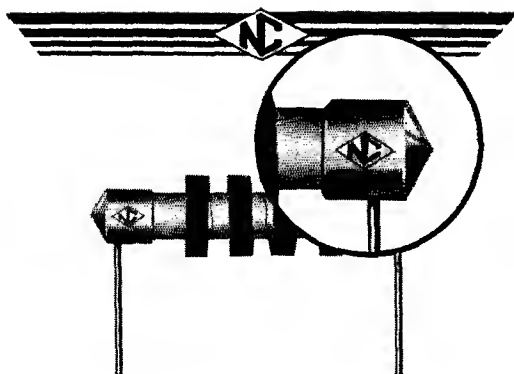
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There are three special colors for Communications Department appointees: Red background for the SCM; Blue background for the ORS; Green background for the RM.

Red and green available in pin type only; blue may be had in either pin or button style. All Emblems priced the same. . . . \$1.00, postpaid.

AMERICAN RADIO RELAY LEAGUE

West Hartford, Connecticut



Appearance is much easier
to imitate than performance.

NATIONAL COMPANY, INC.
MALDEN, MASS.

NC

PANELS — BAKELITE — RUBBER — ALUMINUM
All Sizes Cut to Order **BAKELITE TUBING & RODS**
Drilling, Engraving & Special Work
ALUMINUM CANS—Stock sizes. Special sizes, made to order.
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Length from 1/4" to 6"—price 5c to 30c.

Insulating bushings
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Transmitting frames and racks.

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**5 METER PORTABLE
TRANSCEIVER**

Amateur discount 40% on all National items

Write for our free catalog

▶ CAMERADIO ◀
603 GRANT ST.
PITTSBURGH — PA.

convention will be a leader. Through this announcement a cordial invitation to attend this affair is extended to all amateurs within the Roanoke Division and neighboring states. We have the location, the hotel and you will be assured of a real welcome. All hams talk about it and then drop a card to S. N. Howell, 401 Bullitt Ave. S. E., Roanoke, and tell him you will attend.

Ontario Division Convention

King Edward Hotel, Toronto, Ont.,
Oct. 5th-6th

THE Wireless Association of Ontario, Queen City Amateur Radio, Riverdale Radio Club and the North Toronto Radio Club are sponsoring a convention at Toronto on Friday and Saturday, October 5th and 6th respectively. Plans and details which have been formulated indicate that those who do not attend will be missing something. Therefore, the clubs extend a most cordial invitation to all amateurs to be present and participate in all of the activities during the two days mentioned. There will be distinguished guests amongst whom will be our own General Manager Reid. A.R.R.L. will be represented by Mr. Clinton B. De Soto, Asst. to the Secretary. Sam B. Trainer, Jr., Chairman, 4 Shorncliffe Ave., Toronto, Ont., will appreciate a word from those who desire further information.

Central Division Convention

Neil House, Columbus, Ohio,
Sept. 7th-8th-9th

COLUMBUS will be the Mecca for all hams on the above date, because the Columbus Amateur Radio Association is preparing for a convention that will be the talk for months to come. Put those dates down, fellows, and remember that a cordial welcome awaits you.

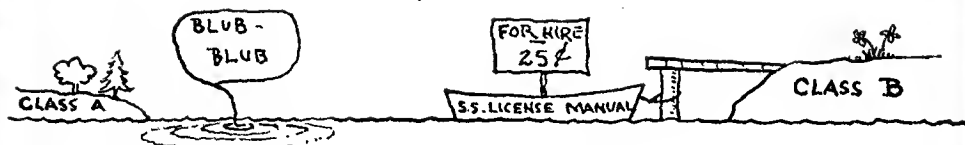
The best of technical talents will be there. Good lectures for everybody. Plenty of stunts, entertainment, etc. Those who attended the hamfest early this year know what the committee can do. Talk this convention over with the next ham and see if the lucky man with an automobile will arrange to take a carful with him. The "motto" is "ON TO COLUMBUS." Further information may be obtained from F. Gibb, Chairman, 85 East Long St., Columbus, Ohio.

Ultra-High-Freq. Gear

(Continued from page 15)

and reception are certain to be genuinely worth while.

Well gang, what say to some hot activity on the ultra-ultra high frequencies? There is plenty of fun to be had and a whole new set of records to be established. Needless to say, all dope on contacts made and new gear developed will be given a particular welcome here at Headquarters.



Johnny Q. Ham, one fine summer day,
Started to swim from Class B to Class A.
The "blub's" show his fate, so dear reader take note:
If you try the same trip, better hire the boat!

THE RADIO AMATEUR'S LICENSE MANUAL

25c, postpaid, no stamps, please

Indispensable for the already-licensed amateur. A necessity for the beginner. Full and complete dope on renewal and modification procedure, the Class A exam (with questions and answers), portable procedure, etc. All the dope on every phase of amateur licensing procedure and, of course, the complete text of the new radio regulations and pertinent extracts from the basic radio law.

Going over your first ham ticket? You need the Manual for its instructions on where to apply, how to go about it in the right way, and most important of all, for the nearly 200 typical license exam questions and answers.

Get a copy of "The Radio Amateur's License Manual" and be sure to get your ticket.

(No. 9 in the series entitled *The Radio Amateur's Library*)

THE AMERICAN RADIO RELAY LEAGUE, WEST HARTFORD, CONN.

FRENCH TYPE HAND-SET

Particularly designed for 56 mc. and portable work. Incorporates a 2000 ohm earphone with a high quality microphone. High output with excellent fidelity. Light weight and durable. Separate cables from microphone and earphone allows any circuit combination.

If your jobber can not supply you, order direct

Type 214 (single-button) net, \$6.00. Type 215 (double button) net, \$9.00

THE ELECTRO-VOICE MFG. COMPANY, INC.
324 East Colfax Avenue, South Bend, Indiana

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New Classes Now Forming! Send for 40-page catalog, explains fully. 180 licensed graduates placed in past 2½ years in broadcasting, shipping, police radio, aviation, etc. We teach all branches. Oldest, largest and best equipped school in New England. Equipped with Western Electric sound and broadcasting equipment and RCA marine transmitter. Course prepares for United States Government telegraph or telephone license.

MASS. RADIO SCHOOL, 18 Boylston Street, BOSTON

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(W6FBI, located in Building)



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Scientific Radio Service was one of the "first" to introduce "Piezo Electric Crystals" for commercial use . . . that was back in 1925 . . . and today, we still pride ourselves with the fact that our aim is toward "QUALITY" Crystals rather than quantity.

PIEZO ELECTRIC CRYSTALS

Every Scientific Radio Service Crystal for use in the Broadcast band is ground to an accuracy of BETTER than .03% on equipment tested regularly by U. S. Bureau of Standards Standard Frequency Signals.

"THE CRYSTAL SPECIALISTS"

Send for Booklet and Price List

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(3) The Ham-Ad rate is 15¢ per word, except as noted in paragraph (6) below.

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Having made no investigation of the advertisers in the classified columns, the publishers of *QST* are unable to vouch for their integrity or for the grade or character of the products advertised.

MICROPHONE and meter repairs. Low prices. Quick service. Sound Engineering Corp., 416 N. Leavitt St., Chicago, Ill.

RADIO engineering, broadcasting, aviation and police radio, servicing, marine and Morse telegraphy taught thoroughly. All expenses low. Catalog free. Dodge's Institute, Byrd St., Valparaiso, Ind.

QUARTZ—Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York.

WIRELESS code classes for beginners and advanced. Complete training for amateur license. \$1.50 weekly. Hart, 114 W. 81 St., New York.

866s—1000 hour guarantee, \$1.49. Eleven other types reasonable. Howard Radio, 314 Pine Ave., Chicago.

QSLs! QSLs! Made to your specifications! Samples? Stamps appreciated. W8DED, Holland, Michigan.

QSL cards, two color, cartoons, message blanks, stationery, snappy service. Write for free samples to-day. W1BEF, 16 Stockbridge Ave., Lowell, Mass.

QSLs, two colors. Samples. Printer, Corwith, Iowa.

KA3AA-W6GVU selling out. Fone and CW transmitters. National single signal receiver. Great variety of meters and all kinds parts. Write for list. Fred Elser, 1625 Grandview, Glendale, Calif.

CRYSTALS, guaranteed, 160 or 80 meters, approximate frequency. \$1 postpaid. 40 meter, \$2. Patey, W8FAV, 235 Southern Ave., Muskegon, Michigan.

WESTINGHOUSE Dynamotor 32-350 volt; W. E. Switchboard No. CW928; DC Super Wasp with coils; Kato Converter 32-110 AC. All for \$15. W9DMC.

CRYSTALS: \$1.35 Hipower oscillators 3500-1700 kc. Bands, close to your specified frequency, 7000 Kc. \$4.25. Plug-in holders with mountings \$1.00. Blanks 65¢ immediate delivery. Send for complete price list and bulletin. Crystals for Broadcast stations, prices on request. Hipower Crystal Co., 3807 N. Luna Ave., Chicago, Ill. You cannot buy a better crystal than Hipower at any price.

SWAP 1927 Harley Davidson complete with saddle bags for superhet receiver. W1EBT, Stamford, Conn.

NATIONAL FBX7 receiver, three band spread coils. National power pack, complete with Radiotron, all brand new. \$45. W. K. Thomas, 529 Overlook Drive, Pittsburgh 16, Pa.

QSLs-SWLs, W6DOU, Hayward, Calif.

TECHNICAL articles and amateur affairs dope not found elsewhere in every issue. \$1.50 yearly; foreign, \$2. R/9, 1455 Glenville, Los Angeles.

MAGAZINE Special! R/9 one year, "Radio" one year, "Kruze's Radiophone Guide with Batcher's Radiographs (Abacs)," and "R/9 Sigs!—Angle Radiation" all for \$3.75 (regularly \$6.); foreign, \$5.25. 1455 Glenville, Los Angeles.

ABACS solve your numerical radio problems without mathematics. Tools needed; ruler and eyesight! Coming serially in R/9.

GENERAL Electric 24/1500 volt dynamotors \$35. 24/750 volt \$25. Westinghouse 27½/350 volt with complete filter system, meter, etc., \$15. 500 cycle 500 watt 110-220 volts \$7.50. 25/275 volt double current generators \$7.50. Henry Kienzie, 501 East 84th Street, New York.

WANTED—to exchange 1932 Harley Davidson 74 motorcycle, perfect condition, for 75 or 100 watt phone transmitter and receiver. Write description. V. J. Cheek, W4ADN, WFTL, Athens, Georgia.

MOTOR generator combination plate-filament, Esco, 1000 v, .9 amp and 10 v, .40 amp. Perfect condition, \$85. f.o.b. H. L. Kimsey, 422 E. Poplar St., Paragould, Ark.

SELL complete 50 watt class B rack-panel 160 meter fone transmitter, \$65. takes it. W8BHE, Burgess, Ohio.

MCMURDO—Silver 5B tubes, crystal, speaker, \$45. cash. George R. Montgomery, 700 Allison Ave., Washington, Penna.

QSLs by Malco. Finest in country. Free samples. Malco, 1512 Eastern Parkway, Brooklyn, N. Y.

TRADE: condenser, resistors, etc. for any good firearms and cameras. James Coe, 25 Laymon Apts., Dayton, Ohio.

WHAT the Amateur needs. Some place where he can sell for cash, trade for other merchandise, or buy standard or used parts and sets at bargain prices. We offer these services. Active Hams in charge 9HWF 9HWD 9FIS. Largest stock of Ham parts in Mid West. National Hammarlund Collins Biley McMurdo-Silver Cardwell Sylvania Ward-Leonard Thordarson Cornell-Dubilier. Walter Ashe Radio Co., St. Louis, Mo.

TRADE QSLs, SWLs printing for meters, tubes, ham apparatus. W8ESN.

QSLs, SWLs, with personality plus. Free samples. Socooco. W8ESN, 1827 Cone, Toledo, Ohio.

MECHANICAL latch overload relay, \$1. Keying relay, 50¢. Details, stamp. R. White, 11030 Hermosa, Chicago.

CRYSTALS: 160-80 meters, approximate frequency, 1", \$1; 40 meters, \$2. Guaranteed. W8EBV, 1397 6th St., Muskegon, Mich.

COMET Pro perfect condition sixty-five bucks. W4ADT.

PHOTOGRAPHIC QSLs—\$2.15 per hundred. Two color printed QSLs, original designs, 75¢ per hundred up. Message cards and stationery. Quick service! Free samples! W2FJE, 151 DeKalb Avenue, Brooklyn, N. Y.

CRYSTALS, guaranteed 80, 160 meters, your approximate frequency, \$1.10. "Y" blanks 50¢. Small size 25¢. W9FHS, 4433 N. Kilbourn, Chicago.

866's—\$1.69; Good, large plate 210's \$1.39; single-button, hang-up microphone, handsome, \$4.95 with ring and springs; 281's-99¢; New RCA 801 in stock, \$41. etc.; National, Biley, Hammarlund, Thordarson, Eveready, Cardwell, etc. Hatry and Young, Hartford.

SELL—National ACWS3 (used week) 6 coils, tubes, pack. Make offer. C. Horn, 325 E. 163 St., New York City.

SELL FB7 receiver with tubes, \$30. cash or what have you to trade. L. A. Daniels, Tuxedo Park, Del.

TRANSMITTER, crystal, 3-stage, UX210 final; dual power units. Good DX record. \$35.00. Rationalized autodyne receiver, tubes, power pack, \$27.50. Hal Justice, W4TS, Canton, North Carolina.

SELL or swap one pair each, ¼ kw. 860s, 211s, 210s. W8AQY, 2905 Perry, Erie, Pa.

MORE power to you. See our May display, following ham-ads Rectifier Engineering Service.

IN stock—lowest prices: All National Patterson, Hammarlund, RME9D, Silver, Skydrider receivers. Trade-in your receiver. All Collins, Thordarson, National, Hammarlund, Cardwell, Taylor, Triplett, Taylor, Trimm, Johnson, Sprague, Biley, others. New W600A mikes \$17.50. Teleplexes rented. Standard used apparatus taken in trade on new or used apparatus. Much used apparatus cheap. Write Henry's Radio Shop, Butler, Mo.

1000 W transformers (GE) 1100-2200-4400 Volts each side center tap. Same as hundreds sold A.R.R.L. members. Dawson. 5740 Woodward, Detroit, Mich.

FB7s, Teleplexes, Omnigraphs, meters, receivers, Vibroplexes. Bought, sold, traded. Ryan Radio Co., Hannibal, Mo.

CRYSTALS: Guaranteed excellent oscillators, 160 or 80 meters, your approximate frequency, \$1.35 postpaid. Crystal Maker's blanks 1" 65¢, dozen \$6.00; ¾" 50¢, dozen \$4.80. Irregular shapes 25¢. Improved dust-proof Bakelite holders, non-exposed 1¼" silvered electrodes, plugs into G.R. or tube socket mountings, any position, 75¢—dozen \$5.40. Fisher Laboratory, 4522 Norwood, San Diego, Calif. Formerly El Paso, Texas.

SELL Gross CW25 transmitter with xtal, coils, tubes, \$15. W2DGF.

TRANSMITTERS—single 45 with power supply, \$9.85. QSO tested. Literature-stamp. W5DHJ.

CLASS B transformers—Universal for two or four 46's, 210's, 800's, RK18's, etc., \$7.75 pair postpaid anywhere in United States. 70 watts of audio from 46's. Write for details. W8UD, Douglas, Michigan.

QSLs! Investigate! New! Attractive! W6FZQ, Box 1804, Phoenix, Ariz.

MASTERPIECE II Allwave Receiver and giant speaker complete perfect condition first check for \$110 takes it. W1ZD, John Wells, Southbridge, Mass.

WANTED! Transmitting tubes and parts, trade mimeograph. W6FZQ.

SELL—Acme Delta AD19 transformers, Don Mix automatic circuit breaker, 10 volt 7 amp. transformer, Weston 10V a.c. meter. All inquiries answered. Bert Felsburg, Frackville, Pa. WANTED—to buy FB7 reasonable. W9GLR, Mason City, Iowa.

BRAZILIAN Quartz, clear, for making piezo-electric crystals. F. Baumgardt, 198 Broadway, New York City.

TRANSMITTERS manufactured to order. Transmitters reconstructed. Holmes C. Miller, Box 105, Palo Alto, California. TRADE $3\frac{1}{4}$ x $4\frac{1}{4}$ R.B. Graflex camera f4.5 for r.f. power amplifier, complete. W2DYT.

COMPLETE Class B phone. W9KQO.

POWER transformers Class B equipment, filter condensers. Need meters, tubes? W9KQO, Topeka, Kans.

WORK stations 3000-4500 miles away, 15 watts output, with single-wire transmitting antenna, scientifically designed. Instructions 25¢. G. Leldahl, W3DGS, 7012 Gillespie St., Philadelphia, Penna.

QSLs 75¢ a 100. 2 colors. W9DGH, 1816 5 Ave., N., Minneapolis, Minn.

CRYSTALS—3500-1715. 1" x within three kc. \$1.95. Standard holders, 75¢. W2DBQ, 1104 Lincoln Place, Brooklyn, N. Y. FLASH!! New Sargent receiver. 8-34 Super-het—15-550 meters, a real amateur job—Complete with 8 tubes, 8" dynamic speaker crackle cabinet \$49.50, prepaid. Sargent 3 tube amateur special—Kit \$16.75. Wired \$19.75. Write for Circular describing both. MARINE Graphite Anode long life transmitting tubes—1000 hour guarantee 35 types—800 \$8.75—211. 242A \$11.50, 852 \$19.75, 860 \$32.50, 212D \$65.00, 204A \$95.00. New model Haigis Transmitter receiver \$19.20. Telescoping Antenna \$2.00. Write about other new Haigis models. Patterson PR-10 Complete \$70.25 Prepaid. Pre-Selector \$17.64 Prepaid. RME9-D \$112.50 Prepaid. Write, new bulletin "Amateur Transmitter," L. I. Marine & Electric Co., 163-18 Jamaica Avenue, Jamaica, N. Y.

FIRST check \$43. takes FBX, tubes, power pack, 2 pair coils. What else do you need? W9DQO, Route 1, Duluth, Minn.

CRYSTALS, guaranteed. 160-80 meter, $\frac{7}{8}$ to 1", X or Y, within 10 kc., \$1.35. 1", within 2 kc., \$2.25, oscillating blanks 75¢, blanks from the saw 50¢, grinding instructions 25¢, plug-in holders, \$1. Wm. Threm, W8FN, 4021 Davis Ave., Cheviot, Ohio.

CRYSTALS, 160-80 meter. Trade for tubes, meters, transformers. Bill. Threm, W8FN, 4021 Davis Ave., Cheviot, Ohio.

SWAP dynamic mike, cable and transformer, for good d.b. mike and transformer. W9APJ, Stuart, Nebr.

SELL—Teleplex ten tapes. Excellent condition. Nine dollars. Clarence Baum, Petersburg, Ill.

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CARBON anode 50 watt tubes, \$9.75 each. New, first quality and fully guaranteed. VTE Laboratories, Ridgefield, N. J.

QST—August 56MC. Station equipment: Transmitter MOPA \$13.75; Modulator \$7.50; Power-pack \$12.75; Receiver \$16.75; Ultra Midget transmitter \$10.95. We build to order. Precision Radio Laboratories, 109 East 94 Street, Brooklyn, N. Y.

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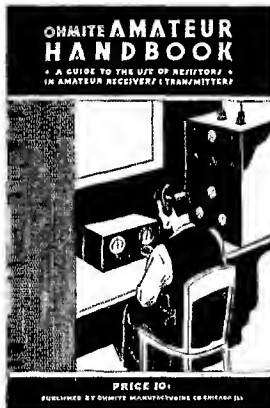
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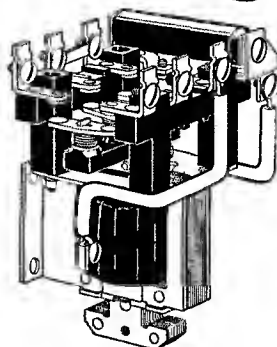
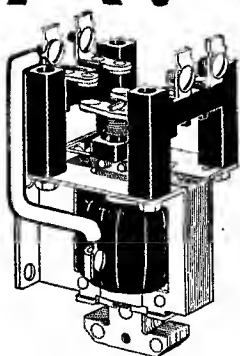
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A.C. RELAYS


Made by

Allen-Bradley



These A. C. solenoid relays are ideal for remote control of transmitters, for control of crystal ovens, and for any general remote control application except for keying. THESE RELAYS WILL NOT OPERATE IN KEYING SERVICE. Silver-to-silver double break contacts are used throughout.

The maximum contact rating is 10 amperes at 220 volts. The relay coils are wound for 115 volts 60 cycle alternating current. Relays for other voltages can be supplied on special order. Use coupon below when ordering.

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				Open	In Cob.					Open	In Cob.
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A127	1	Open and Closed		5.00	6.00	A217	2	Closed		6.00	7.00
A137	1	Open		4.00	5.00	A227	2	Open and Closed		7.00	8.00
A147	1	Closed		5.00	6.00	A237	2	Open		4.50	5.50
A157	1	Open and Closed		5.50	6.50	A247	2	Closed		6.50	7.50
A167	1	Open		6.50	7.50	 <p>Radiostat—A stepless graphite compression rheostat for primary of 550 watt filament or plate supply transformer. Range 4 to 150 ohms. Price \$6.50</p>					

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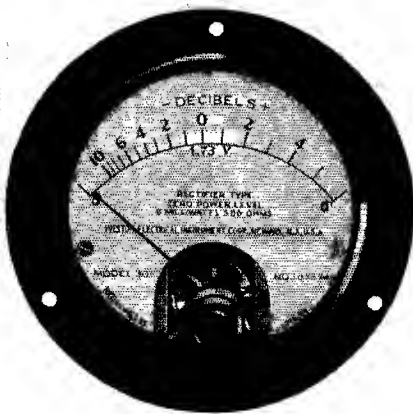
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OF TRANSMISSION EFFICIENCY

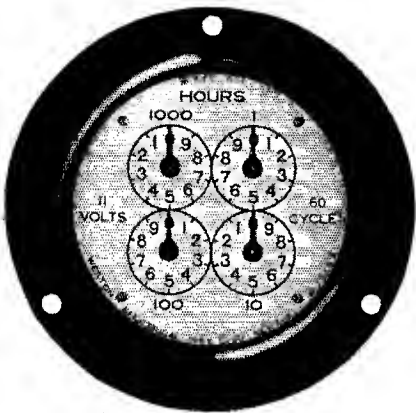
WESTON POWER LEVEL INDICATORS (DB METERS)



Weston Model 301 Power Level Indicators are available in three types: *High Speed*, for the indication of modulation peaks; *Low Speed*, for measuring integrated average modulation over approximately a one-second period; and *General Purpose*, which integrates somewhat and shows heavy peaks.

These instruments normally are available adjusted to read either 0 DB or down 10 DB at 0 on the scale, based on a 6 milliwatt signal in either a 500 or 600 ohm line. The internal resistance is 5000 ohms for 0 DB or 1581 ohms for down 10 DB. These specifications are standard for the 301 line. Other instruments also are available for other levels, lines or resistances. Send for bulletin.

WESTON HOUR COUNTERS



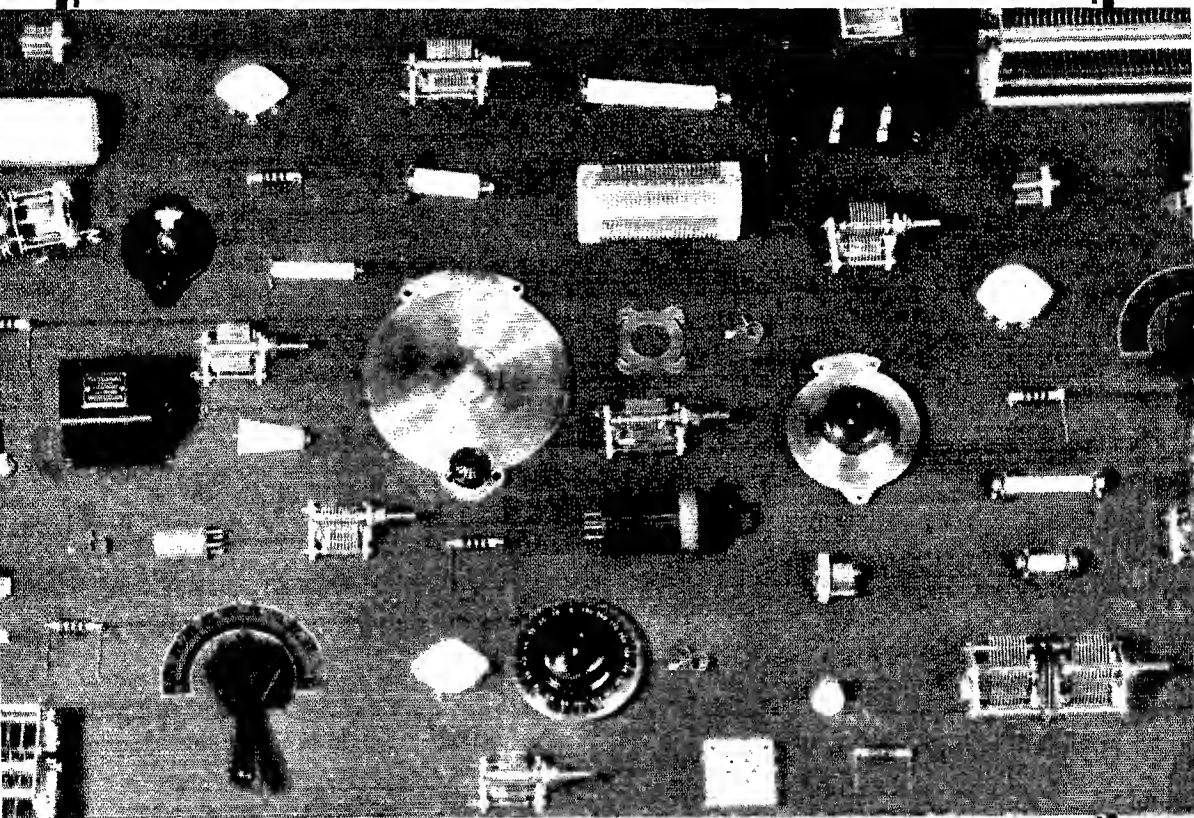
The Weston Hour Counter is a small, inexpensive device which indicates in hours the operating time of radio tubes in transmitters, and other electrical equipment. These hour counters are used on medium and high powered transmitters in order to keep a log of the elapsed time. Thus tubes can be replaced after some predetermined period of use, rather than wait for complete failure with consequent service interruptions. Literature on request . . . Weston Electrical Instrument Corporation, 602 Frelinghuysen Avenue, Newark, N. J.

WESTON

Radio Instruments



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Incorporating new features of design and construction, the RCA 865/565 finds advantageous application in amateur transmitters designed for quick band changing. Neutralization of the RCA 865/565 is seldom required when adequate shielding is employed. This feature makes this type particularly useful in buffer or doubler stages of transmitters designed for rapid QSY's.

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